FOR
BETTER MANAGEMENT
OF
PLANT OPERATIONS

FACTORY

june 1960

PRICE ONE DOLLAR

A McGRAW-HILL PUBLICATION

SPENDING IN THE '60s
p. 84

YOUR STAKE IN POLITICS
p. 89

COVER STORY
PRE-PLANNING POWER GROWTH
p. 80

PRECISION:

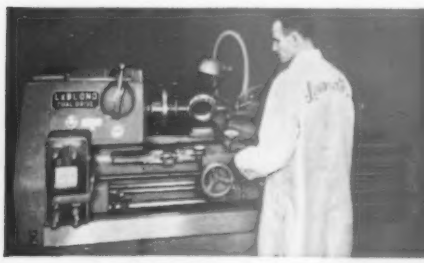
Beryllium specialists, Leemath Incorporated of Long Island, create delicate and precise mechanisms in this high strength but toxic and abrasive wonder metal. In their temperature-controlled shop, this feather-light gyro float assembly (shown actual size, right) was turned on a special high-precision LeBlond Dual-Drive Lathe. *Spherocity had to be concentric with the two major axes within .0005" total indicated runout of 1.8750"!* (To hold the assembly that close, component tolerances had to be even tighter!)

To perform such touchy work, Leemath ordered their LeBlond 15" Dual-Drive to ultra-high precision standards. For this lathe Timken furnished specially-made bearings with one-third the runout of their finest precision class. With it came the standard features that give LeBlond its reputation for long-lived precision —combination gear-belt drive headstock with 16 speeds, 31 to 2400 rpm; compensating vee bed way construction with hardened steel shears; thrust-lock tailstock; and many more.

People buy lathes for many reasons. But when, like Leemath, they must have precision they can depend upon, that is reason enough to buy LeBlond.

If you would like to have the full story of LeBlond's Dual-Drive, ask your distributor or write for Bulletin 6A.

Reason enough to buy LeBlond



THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LEBLOND of Cincinnati

For more facts circle 382 on READER SERVICE CARD

Hose bends over backwards to do a good unloading job

WORKERS at a southern Ohio chemical plant were having a terrible time unloading carbolic oil through metal tubing. Making the connection from river barge to pump was a chore—the tubing was heavy, hard to maneuver, a strain to connect. It couldn't take sharp angles or stand much bending. Sometimes the metal hose would spring a leak after only a few hours' service.

After discussing the problem with a B.F.Goodrich man, the company decided to try a rubber hose which BFG built specially for the job. A continuous spiral of round spring steel wire within the hose was used to add strength, increase crush resistance, prevent collapse under vacuum.

You can see for yourself how flexible the hose is. Even though bent at a sharp angle, the BFG hose doesn't kink or buckle. It adjusts easily to the movement of the barge. Inside, the hose lining is oilproof. And for protection against rough dock service, the hose cover is made of a tough rubber compound that resists abrasion, weather, sun.

At last report, the B.F.Goodrich hose had been in service a little over eight months, had needed no maintenance, was still in good shape. It had put an end to the mess of oil leaks and the cost of frequent tubing replacements.

Your B.F.Goodrich distributor has full information on this particular hose. And, as a factory-trained specialist in rubber products, he can answer your questions about the many rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-835, Akron 18, Ohio.*

B.F.Goodrich

FOR BETTER
- PLANT MAINTENANCE & ENGINEERING
- PRODUCTION
- PLANT MANAGEMENT

JUNE 1960

FACTORY

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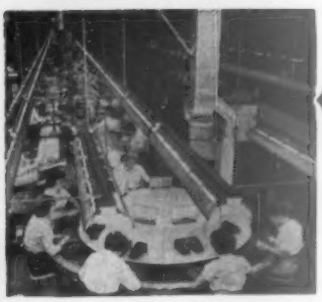

Sequence trays put an end to assembly-line fumbling at Bendix Aviation (page 180) . . . **Infra-red gaging** at Armco Steel makes a cinch of measuring width of hot steel strips, moving as fast as 200 fpm. (page 181) . . . **Six-station assembly tables** at Motorola are staffed by employees who work side by side with automation (page 184) . . . **A four-step plant housekeeping program** brought organization to a helter-skelter system at Mack Trucks, and is paying dividends with a cleaner plant (page 188).

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COMING

In July you'll read about a management group working modern manufacturing miracles with a 70-year-old plant . . . You'll go on location and see how the Seeburg Corporation "cut" record profits in 1959 while grossing the same sales as it did in the previous year. Also, **in the months to come,** you'll discover: Layoffs need not cripple morale in your plant community . . . Computers can be understood—if you know the program

THE COVER

Against the torrid light of a giant drying oven, managers Katko, Hostetter, Blay, and Marken (front to rear) inspect latest electrical innovation at GM's Linden, N.J., plant.

Painting by Frank Lacano

69TH YEAR OF PUBLICATION

JUNE 1960 Vol. 118 No. 6

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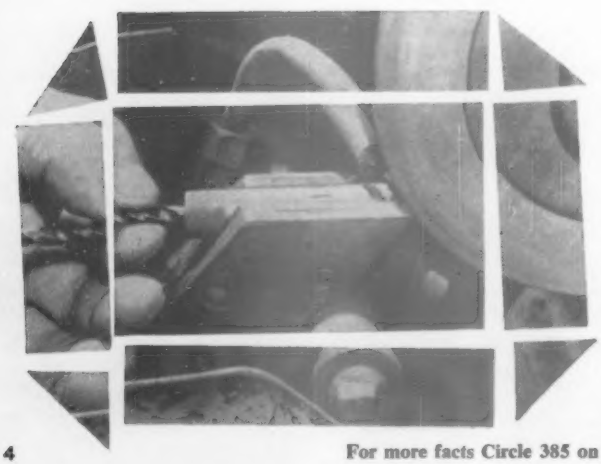
DIAMONDS AT WORK

Industrial diamonds are, first and foremost, *tools.* They're used in many ways to do many jobs. Diamonds keep hardest carbide tools sharp and efficient. Diamond wheels shave jet runways to perfect smoothness. Diamond tools speed up production of precision aluminum parts for automobiles. Diamonds machine close-tolerance ceramic components for electronic systems.

These jobs *could* be done with other cutting and abrading tools. But in every case, diamonds do them better. Not only better: *more economically, too.*



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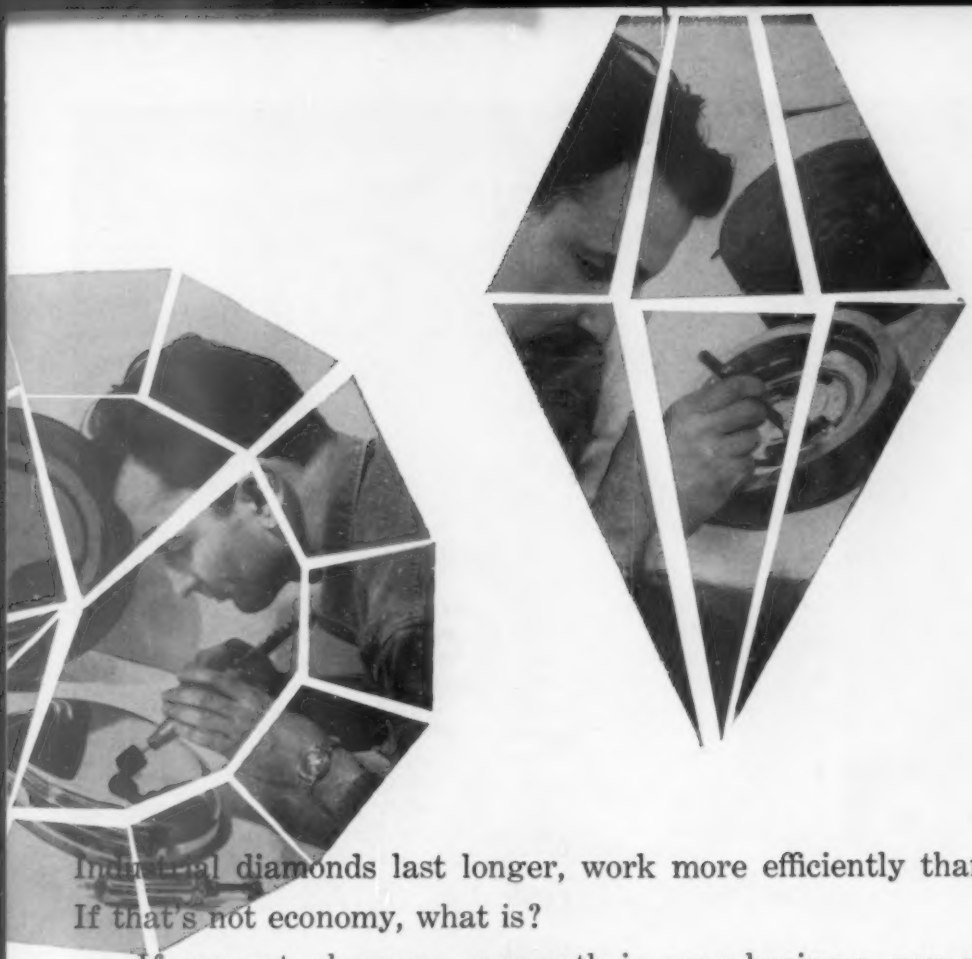


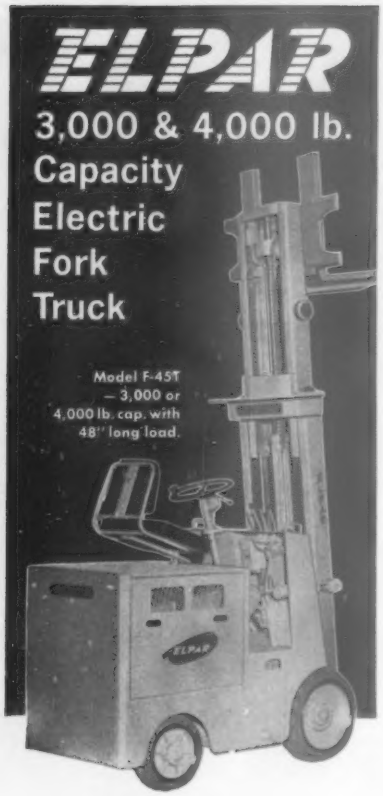
Industrial diamonds last longer, work more efficiently than anything else. If that's not economy, what is?

If you cut, sharpen, or smooth in your business, you can probably use diamonds to advantage. Wide assortments are available in any quantity to your diamond wheel and tool maker. See him for more information.

INDUSTRIAL DISTRIBUTORS (SALES), LTD.

INDUSTRIAL DIAMONDS CUT PRACTICALLY EVERYTHING... ESPECIALLY YOUR PRODUCTION COSTS

Industrial Distributors (Sales), Ltd., is the world distributor of natural industrial diamonds . . . the most efficient cutting, polishing and abrading substance known to man. Industrial Distributors sponsors the Diamond Research Laboratory. Its work is devoted exclusively to investigations on all phases of the diamond. The Laboratory stands ready to offer information and assistance to all users of industrial diamonds. Please address your inquiries to: The Diamond Research Laboratory, P.O. Box 104, Crown Mines, Johannesburg, Union of South Africa.



PRICED TO FIT ANY BUDGET

The ELPAR F-45T is priced competitively yet offers the ultimate in quality that's traditional with all ELPAR electric trucks. Check these advantages:

- **Fast Travel and Lift**
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And, it's economical. The F-45T operates on only pennies per day and is designed for fast, easy maintenance.

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In Canada: Industrial Equipment Co., Ltd.

FACTORY LETTERS

Who's Confused on Labor Troubles?

Dear Sir:

The misconceptions you reveal in your editorial, "More Labor Trouble Ahead?" in the March issue of FACTORY (page 79), appear to reflect a bias in favor of the way Walter Reuther would like to run industry and against other methods more in keeping with the ways of the American private enterprise system.

You appear to accept as fact the statement by Mr. Reuther that "Jimmy Hoffa's gang" is behind the first unified move in the construction industry to sell its services. Mr. Hoffa had no connection with this effort, which is dramatically opposed to the control methods he is accused of using.

I presume you know that automation (and similar applications that have raised productivity and permitted an unbroken line of wage increases) has and will continue to reduce the labor force in industrial plants. The industrial unions representing these workers, in their quest for ever-increasing wage increases and job opportunities, have written into labor agreements with industrial management highly restrictive clauses forbidding management to contract work out. Over the past five years the number and scope of these restrictive clauses have increased. More and more of them attempt to obtain major modernization and new construction work for in-plant personnel.

The construction industry, the management of the contracting companies, and their employees—who usually are members of the building trades unions—decided this threat to their business and employment opportunities could be met better by a sales approach to industrial management than by an attempt to resolve the issue on the basis of labor jurisdiction. Fortunately, they had available as guide an important research study in this field.

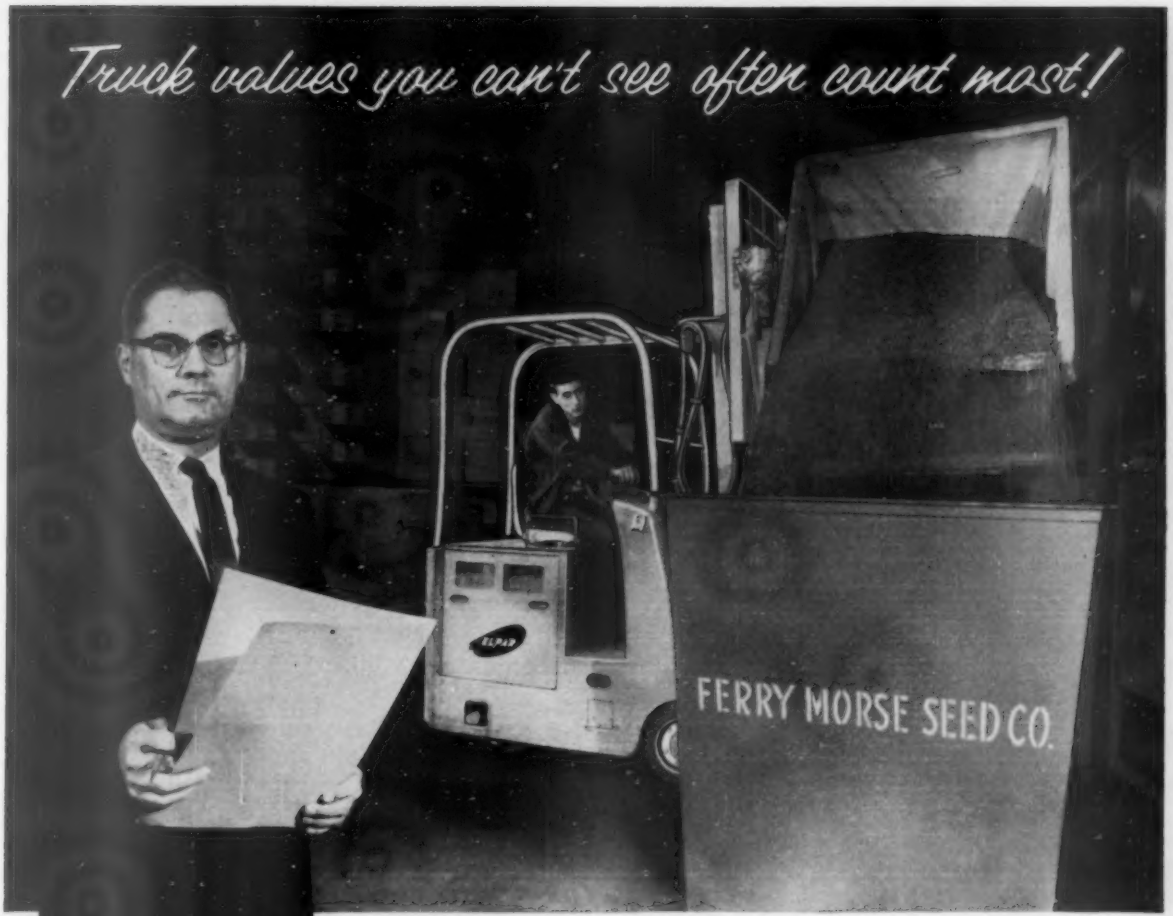
The brochure, "Maintaining Production for America," is merely a statement of the values to the customer of the contract method of performing construction of all types—new, repair, modernization, and that type of maintenance where construction workers have a high level of competence. The construction industry is not attempting to force management, through the economic power of the unions, to do something. Rather, it is seeking to sell management on the benefits of a method that has been the means of building America to what it is today. The Pandora's Box you say would be opened by having contractors handle industrial construction and certain maintenance is not as forbidding as the one that will be opened by a vast, monopolized, do-it-yourself operation. Research studies show that, in general, industrial management does not accurately know its true maintenance costs and that cost often is sacrificed on the altar of "peace with the union at any price."

American management cannot afford to be hamstrung like this if it is going to make a decent showing in the coming world economic competition. It is unfortunate that your editorial offers no constructive guide to a better solution.

George B. Roscoe
Executive Secretary
Council of Mechanical Specialty Contracting Industries, Inc.
Washington 6, D.C.

► We believe your analysis of the situation is forthright and moderate. But we cannot agree with all your conclusions any more than you could with ours.

Our quarrel (by our I refer to the readers of FACTORY, not



CHARLES BURGY
San Francisco Service Engineer

Ferry-Morse proved it in the case of the CANTANKEROUS CONTAINER

To cut handling costs, Ferry-Morse Seed Co. in Mt. View, California introduced a new bulk handling system for transporting and storing seed. Although the system proved sound, the method of handling posed a problem.

Ferry-Morse plant maintenance man, Charles Schembri called in Charles Burgy local ELPAR service engineer and together they developed a way to add a hydraulic rotating unit to their existing trucks. Now containers are rotated and dumped, eliminating the troublesome dumping method previously used. Result: the system has been operating dependably ever since... and, as always, there was no charge for the ELPAR assistance.

This case illustrates the point—*values you can't see often count most!* These ELPAR trucks not only proved versatile enough to meet a change in handling procedure... but Elwell-Parker is one company who is genuinely interested in helping customers find better handling methods... sometimes long after a truck has been sold.

If you want the most for your money—a top quality truck plus extra values like these—make your next truck an ELPAR!

Write for a copy of ELPAR's general catalog.

ELPAR
ELECTRIC TRUCKS

The ELWELL-PARKER Electric Company
4020 ST. CLAIR AVENUE
CLEVELAND 3, OHIO

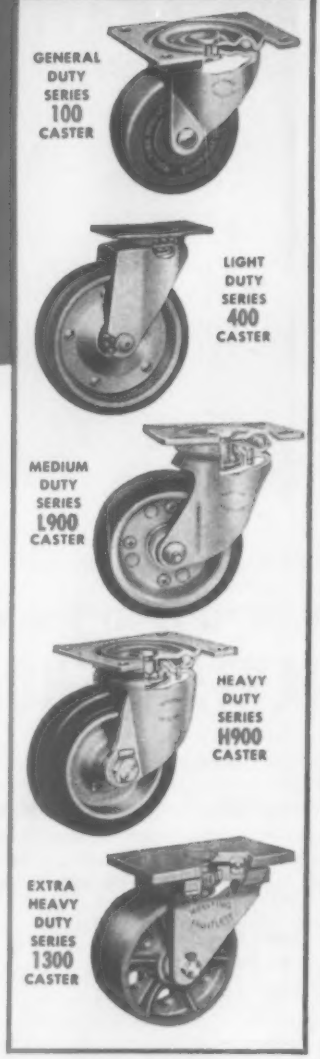
Leading producer of electric powered fork, platform and crane trucks

on

Faultless Casters

Eliminate costly, one-at-a-time handling methods with Faultless Casters! Parts—even heavy ones—can be stacked high on Faultless Casters, ready for further processing. Fully loaded Faultless Castered trucks, carts, dollies, racks roll easily, smoothly . . . carrying your products from machine to machine, around corners, down narrow aisles, even outdoors. And products stocked on Faultless Castered equipment require minimum rehandling for packaging, or shipping. Faultless engineers a complete line of precision casters to meet your specific requirements.

ASK YOUR DISTRIBUTOR. Your nearby Faultless Industrial Distributor and the local Faultless Sales Engineer will work with you to eliminate costly one-at-a-time handling methods at your plant.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Begins on page 6

the publication) is not with the construction industry, as such, or even with the construction unions. Our chief complaint is against the industrial unions (as exemplified by Walter Reuther's leadership) and their failure to encourage plant management in its efforts to establish wage rates and working rules that permit larger rewards to and greater flexibility with skilled employees.—ED.

"Mostyn Is Right!"

Dear Sir:

I congratulate you on publishing "How to Organize for Better Maintenance," by Tom Mostyn (September 1959, page 109).

The fascinating feature of the whole article is that it enunciates the principles on which the Kodak organization at Harrow, England, has been working for some eight years. The fact that we are now operating at a high level of efficiency is striking confirmation of the practical value of Tom's recommendations, as these key points show:

Objectives — We summarize the maintenance supervisor's responsibility in training thus: "To insure that, at minimum cost, plant and equipment are available for productive use for the scheduled hours, operating to required standards with minimum waste."

The status of maintenance — We preach that as we move into automatic production methods, the maintenance battle is lost or won on the drawing board. The day is past when the maintenance function is interpreted as an organization designed to rush in with oil can when machines stop. It must have a voice in design—see that maintenance needs are incorporated in the design concept.

Turn the page

FACTORY welcomes opinions and suggestions from its readers. They help us put management problems in better perspective. Letters should be addressed: The Editor, FACTORY, 330 West 42nd St., New York 36.

For more facts Circle 388 on Reader Service Card

5 TIMES MORE SHIPPING OUTPUT PER MANHOUR!

At National Vendors, Inc., Acme Idea Man Tom Parsons (right) helped develop this efficient, money-saving system (Idea No. 54-9).

Used to be that this vending machine producer could expect to package 65 machines a day for shipment. Their Acme Idea Man was convinced that an F1 Strapping Machine would increase efficiency, speed service and cut costs.

Right he was. Today, this same manufacturer can package up to three times as many machines—with only *half* the manpower.

Look further into the facts on how you can benefit from Acme Steel's leadership in steel strapping methods. Clip the coupon now.

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STRAPPING

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Chicago 27, Ill.

Please send me Idea No. 54-9 and examples of how major companies in my field use Acme Steel Strapping.

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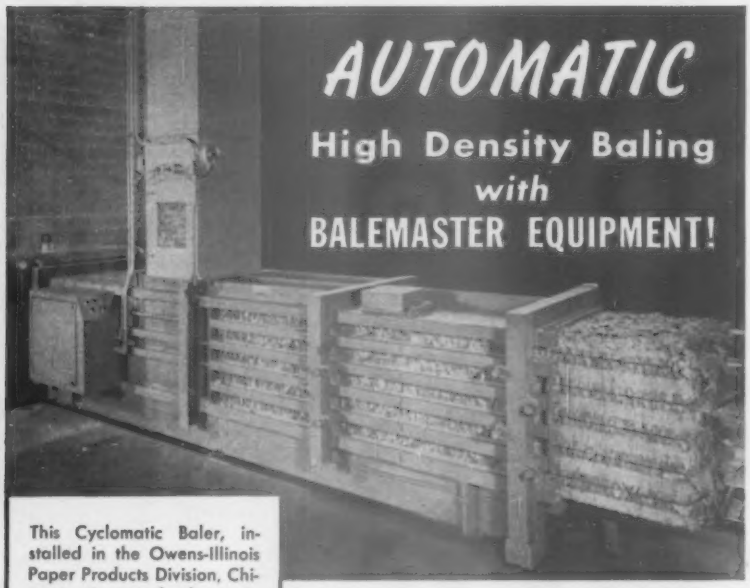

This Cyclomatic Baler, installed in the Owens-Illinois Paper Products Division, Chicago, is completely automatic. It is fed by the Cyclomatic Pneumatic Conveying System which picks up scrap from the entire plant. A Cyclomatic Hogger, not shown, reduces the larger pieces of scrap to a size suitable for air conveying and efficient baling.

One of many Cyclomatic pick-up stations in the Owens-Illinois Paper Products Division Plant. Scrap is quickly and automatically conveyed to the Cyclomatic Baler at a rate of 100 pounds per minute through each pick-up station.

√ If you have a pneumatic-conveying system now all you need is CYCLOMATIC BALING EQUIPMENT . . . specifically designed to provide you with a modern efficient baling system with plenty of reserve power to meet all your requirements.

√ If you do not use pneumatic-conveying or if your present system is not adequate to properly prepare materials for automatic baling, Balemaster can design and furnish a modern, efficient pneumatic-conveying system for your plant . . . or Balemaster can design and install the complete Cyclomatic System for *automatically handling and baling scrap.*

√ The Cyclomatic System is completely automatic—no manual handling of scrap from the point of generation to the finished bale.

For the one company that designs, engineers, manufactures and can install a complete integrated system for your needs — depend on Balemaster.

***CYCLOMATIC* Means Automatic Scrap Material Handling and Baling.**

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Balemaster DIVISION OF
EAST CHICAGO MACHINE TOOL CORPORATION
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FACTORY / LETTERS

Begins on page 6

Pinning the responsibility — Allowing production to be responsible for their own maintenance is as weak, organizationally, as letting them do their own inspection. We charge the engineering organization with providing a service. We measure the effectiveness and the cost of their work. To this end, we have decentralized the whole of our engineering service administration.

Multi-craft forces — We have experienced no difficulty in the supervision of expert operators by supervisors who may not have the same background. The development of a single maintenance man who has an appreciation of mechanics, electrical and electronic components, compressed air and hydraulic elements is essential for modern machines.

Scheduled maintenance — The backbone of the maintenance service centers round repetitive, preventive maintenance schedules for maintenance supervisors.

I am sure that you and Tom, and your readers who must have been impressed with his challenging article, will be gratified to know that it all works!

G. C. Corder
Maintenance Manager,
Kodak Limited
Wealdstone, Harrow, England.

FACTORY

June 1960 Vol. 118, No. 6

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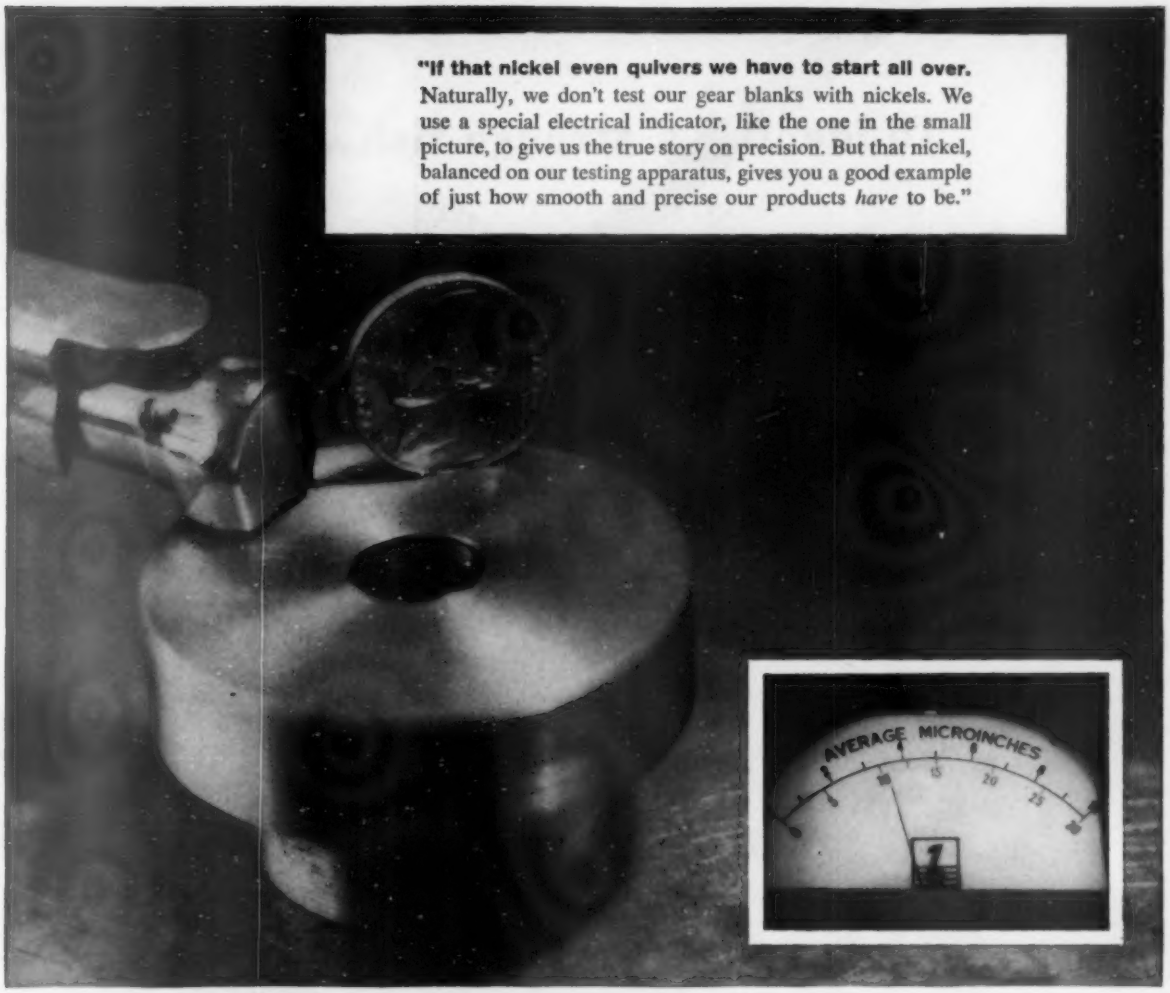

"If that nickel even quivers we have to start all over.
Naturally, we don't test our gear blanks with nickels. We use a special electrical indicator, like the one in the small picture, to give us the true story on precision. But that nickel, balanced on our testing apparatus, gives you a good example of just how smooth and precise our products *have* to be."
AVERAGE MICROINCHES
10
15
20
25

"We depend on Cities Service for absolute precision!"

Lester E. Hoffmann, Treasurer and Vice-President
American Screw Machine Products Co., Chicago, Ill.

"The screw machine business is a highly competitive trade. We've built our business and our reputation on top quality, high-precision products . . . gear blanks that require the closest tolerances in *all* aspects. That means *we have to have* the best-quality cutting oil available. We've depended on Cities Service for nearly 25 years and they've never let us down."

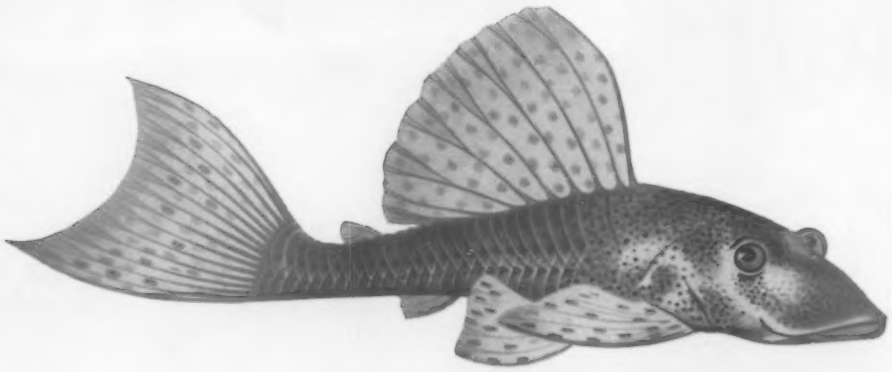
"Matter of fact," says Mr. Hoffmann, "they insisted we try other brands just to prove that Cities Service was the best for us. They proved their point. We've stuck with Cities Service."

At the present time, American Screw Machine Products Co. is using Cities Service CHILLO 10 Cutting oil, and some CHILLO 22. As Mr. Hoffmann says, "The sulphur and chlorine additives prevent welding and galling action which allows for fine finishes and long tool life that maintains high-precision, top-quality work."

If you use petroleum products in your operations, why not talk with your Cities Service Lubrication Engineer? He can help you get the most from your operations by giving you the finest products, the best service available. Or if you prefer, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

To identify a strange fish...



you call in an *ICHTHYOLOGIST*

(specialist in fish life)

to cut production costs...

you call in *LINCOLN*

(specialists in arc welding)

BECAUSE of high operating costs a Maryland barge builder had trouble meeting competitive prices. The LINCOLN Field Engineer recommended a semi-automatic "Squirt" welder. On heavy plate it was four times faster and reduced overall costs due to reduced plate preparation and cleaning time.

As a matter of fact, right there is a good reason for doing business with LINCOLN. Cost reduction is a sort of religion at LINCOLN where production costs have dropped as much as 50% in the last 20 years. It's the result of LINCOLN'S world-famous cooperation between employees and management where everybody gets paid according to his own contribution to the company's goal—superior products and service to you at continually decreasing costs.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

To learn how LINCOLN can be of service to you, write today

THE LINCOLN ELECTRIC COMPANY
Dept. 1810 • Cleveland 17, Ohio

LINCOLN WELDERS

For more facts Circle 392 on Reader Service Card

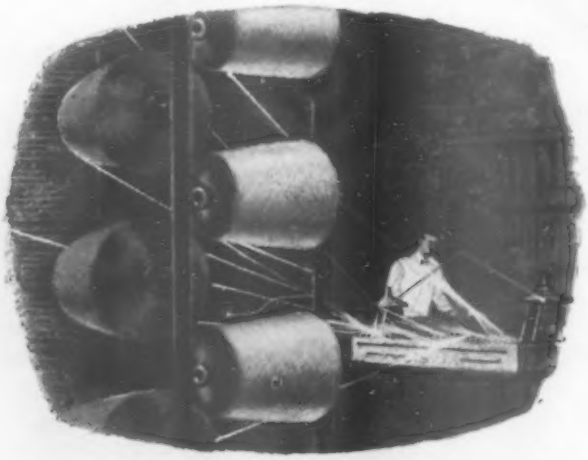
GOODYEAR

EVOLUTION OF

IT ALL STARTED when Leonardo da Vinci invented the belt drive for his polishing wheel. Spurred on by the drive's many advantages, engineers have striven for a more effective method of indirect power transmission ever since.

THE NEXT MAJOR DEVELOPMENT, although then seemingly unrelated, was the discovery of the vulcanization of rubber in 1839. Charles Goodyear not only fathered a multibillion-dollar industry, but also helped pave the way to much more efficient power transmission.

ANOTHER MAJOR BREAKTHROUGH came in 1941, when Goodyear introduced the first practical Steel Cable V-Belt for use on Army tanks. Here was the strongest, most efficient, most heat- and stretch-resistant belt ever built. A wartime success, steel cable is used in belts handling today's toughest industrial drives.

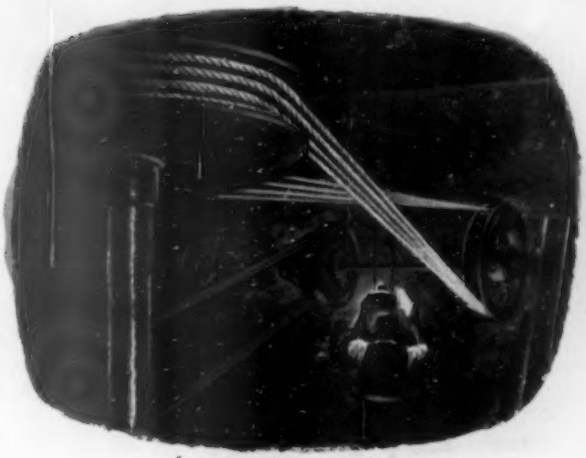


THEN CAME THE "MIRACLE" FIBERS and super-rated V-belts. Again Goodyear was in the fore with the HY-T V-Belt—a strong, shock-resistant belt that answered most multiple drive problems. But V-belt makers still sought a more effective way to overcome stretch and shrinkage.

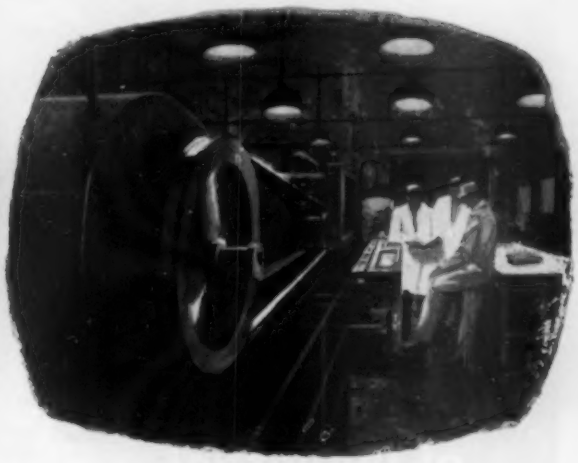
For maximum, trouble-free horsepower hours on any V-belt drive, insist on the top belt from the top beltmaker.

Lots of good things come from GOOD

A REVOLUTION

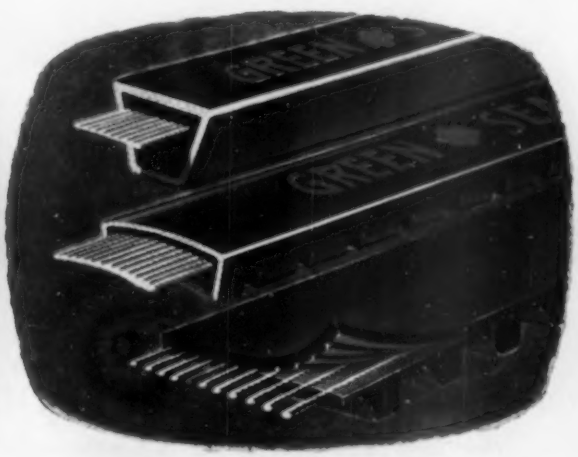


OVER A DECADE PASSED BEFORE a man named Combe introduced two new ideas in the transmission of power—teams of load-carriers and "wedge-in" action. His first multiple rope drive was not very efficient or durable, but started a whole new trend in development.



IT TOOK A LITTLE TIME before the first rubberized V-belts were introduced. Many of the earliest improvements were developed by Goodyear scientists. The greater efficiency of the V-belt soon placed it on many drives, despite shortcomings in length stability and strength.

GOODYEAR SOLVED THE PROBLEM with the 3-T Process to take surplus shrinkage and stretch out of synthetic cord. That development made possible multiple drive V-belts with true dimensional stability—Green Seal V-Belts by Goodyear that stayed matched on the drive or in storage.



A REVOLUTION IN POWER TRANSMISSION was launched by the complete line of V-belts with the Green Seal—Compass-V-Steel, HY-T, E-C Cord, and the compact new HY-T WEDGE. With P. D. (positive drive) and Variable Speed Belts, they combine to offer Goodyear belts of unsurpassed quality for every need.

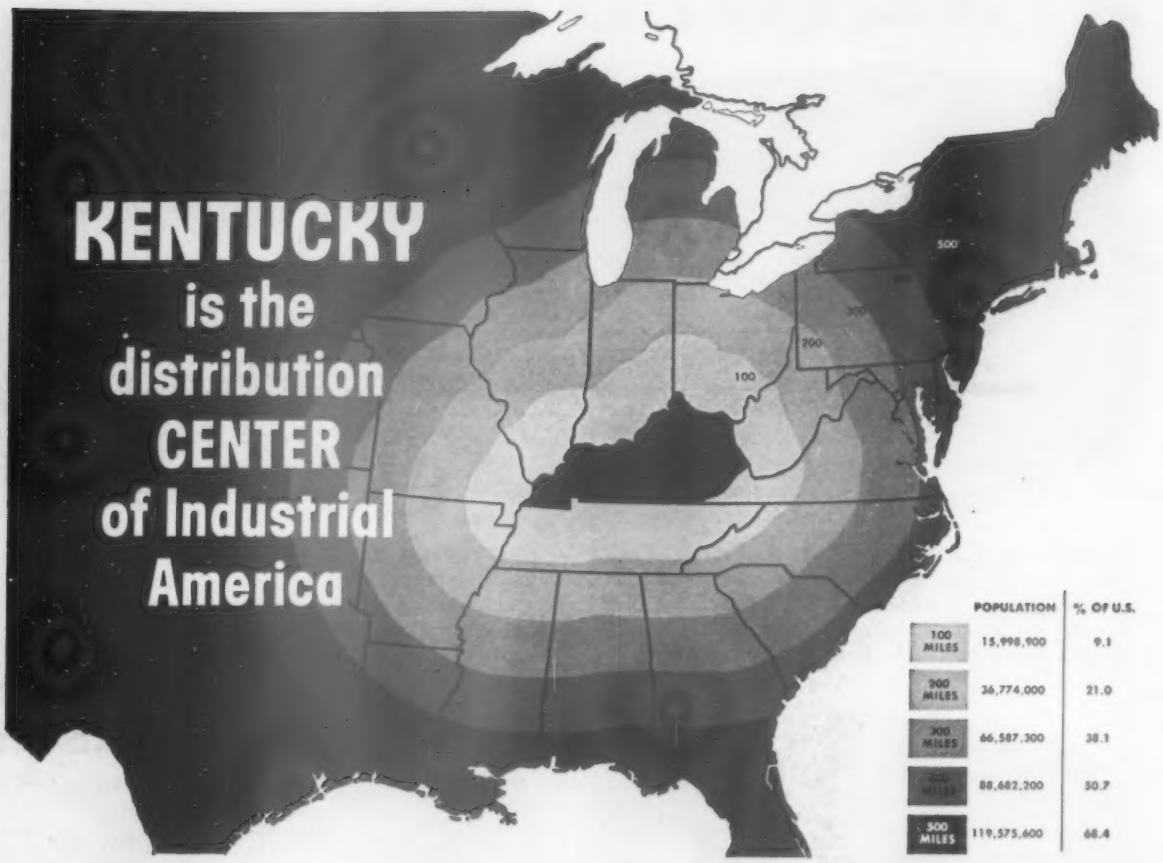
See your Goodyear Distributor or write: Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

YEAR **THE GREATEST NAME IN RUBBER**

HY-T, Green Seal, E-C, Compass, P D -T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

For more facts Circle 393 on Reader Service Card

KENTUCKY is the distribution CENTER of Industrial America



KENTUCKY is at the center of industry and consumption in America. Its northern boundary is mere *miles* south of the U. S. center of population. Its eastern border is a day's drive from the Atlantic—its western border is the Mississippi —its southern border looks down into the deep South. *68.4% of America's total population lives within 500 miles of this State.*

No other uncrowded area in the Nation is so close to so many customers—so close to so many of industry's raw materials and components.

These are some of the reasons why Kentucky industry is growing 43% faster than the U. S. average—is up 135.1% from World War II, as compared with 94.5% for the U. S. as a whole.

And Kentucky WANTS the kind of growth your plant can help produce. Kentucky *people* want you —businessmen, workers, railroads, utilities and the State Government are surging with activities to make Kentucky more attractive and more *profitable* to you than any other state in the Union.

In recent years, more than half the companies who sent representatives to study the Kentucky facts *have since located new plants here.* Show us your distribution picture, and we will show you what Kentucky offers. *Address:*

Lieutenant Governor Wilson W. Wyatt, or
E. B. Kennedy, *Commissioner,*
Department of Economic Development
500 State Capitol Building, Frankfort, Kentucky

COMMONWEALTH OF KENTUCKY

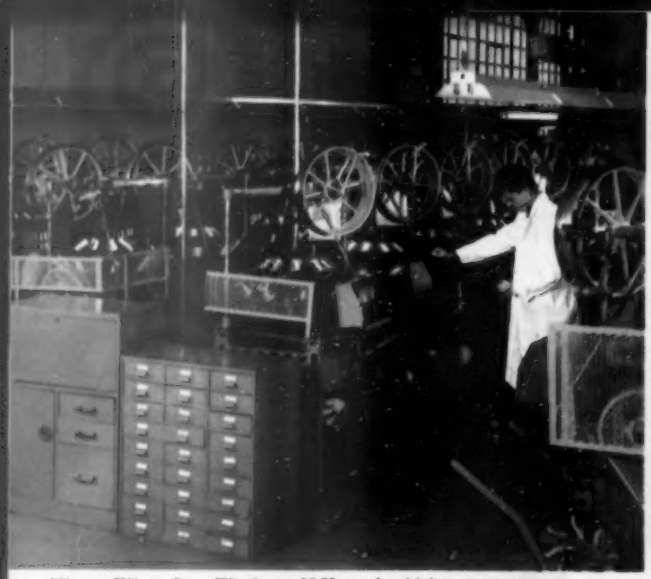
WHERE BIG THINGS ARE HAPPENING

At the request of Governor Bert Combs, Lt. Governor Wilson W. Wyatt (nationally-known lawyer, and National Housing Expediter after World War II) devotes his full authority to Kentucky's industrial development.

A tremendous new program has been set up to supplement all standard development procedures. Every branch of State Government is involved, and the program is backed by hundreds of private organizations. Tax legislation favorable to industry . . . a new 3% sales tax to finance better schools, roads and other improvements . . . state authority for building airstrips, and access roads to plant sites . . . an Industrial Development Finance Authority, recently upheld by the Court of Appeals, to aid local industrial development projects . . . these and many other great forward strides *have been made* or are now on the threshold of accomplishment. *Big things are happening in Kentucky.* Write for full details!

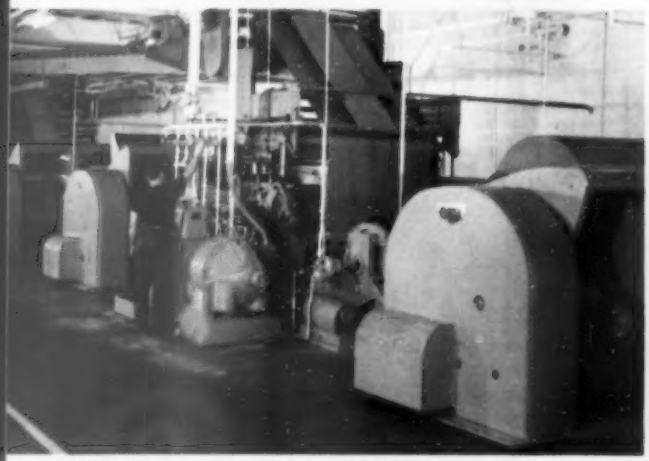
For more facts Circle 394 on Reader Service Card

For more facts Circle 395 on Reader Service Card ➤



Hitemp Wires, Inc., Westbury, N.Y., makes high-temperature insulated wires and cables for aircraft and missiles fields.

Graflex, Inc., Rochester, N.Y., produces photographic and electronic equipment of unusual versatility and reliability.



Hankins Container Company's Cleveland, Ohio, plant fabricates corrugated paper shipping cases and paper containers.

Chrysler Corporation's huge stamping plant in Twinsburg, Ohio, manufactures metal body parts for its many motorcars and trucks.

Pittsburgh COLOR DYNAMICS® helps to increase productive efficiency in a wide range of industries

- **Improves working conditions**
- **Lessens eyestrain and physical fatigue**
- **Enhances morale of employees**
- **Reduces hazards of time-loss accidents**

• **Many hundreds of industrial plants** all over America use Pittsburgh COLOR DYNAMICS to improve productive efficiency and well-being of their workers. These industries range from textile and paper mills to factories making motorcars, farm tractors and airplanes. By following the principles of this modern painting system, work areas are made more pleasing. Workmanship and productivity are improved. Safety colors on controls, motorized equipment, cranes and traffic lanes reduce danger of accidents. And COLOR DYNAMICS assures these benefits at no greater cost than conventional maintenance painting.

• Send coupon for free copy of booklet which explains what COLOR DYNAMICS is and how it can be applied. If you wish, we'll also gladly prepare a detailed color plan of your factory without cost or obligation.

Watch the Garry Moore Show—CBS-TV—Tuesday evenings.

PITTSBURGH® PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

Pittsburgh Plate Glass Co., Paint Div., Department F-60, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your booklet "COLOR DYNAMICS."

☐ Please have your representative call for a COLOR DYNAMICS survey without obligation on our part.

Name_____

Street_____

City_____ County_____ State_____

25% LONGER LIFE RIGHT DOWN THE LINE

GOULD MOTIVE POWER BATTERIES HAVE THE NEW SILCONIC PLATE THAT:

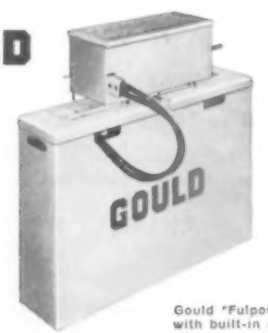
▪ lengthens battery life ▪ minimizes overcharge effects ▪ lowers battery self-discharge ▪ reduces operating costs.

See your Gould representative for more information. He's listed under "Batteries—Industrial" in the Yellow Pages. Gould-National Batteries, Inc., Trenton 7, N. J. *IN CANADA, WRITE TO GOULD-NATIONAL BATTERIES OF CANADA, LTD., 1819 YONGE STREET, TORONTO, ONTARIO.*

More Power to you from **GOULD**

Gould Battery
for "walkie" type trucks

Gould Battery
for rider-type industrial trucks



Gould "Fulpowr" Unit
with built-in charger

For more facts circle 396 on Reader Service Card

Cuts assembly time in half with...

NEW ROTOR J-40S IMPACT WRENCH

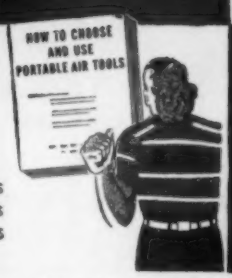
JOB: Driving ⅜" bolts to attach cover and insulators on distribution transformers. Formerly used ratchet hand wrench ... fatiguing to the operator ... a bottleneck.

RESULTS: New Rotor J-40S Air-Powered Impact Wrench (with special extension drive to clear insulators) does the work in less than half of former time. Bolt tightness is uniform. Operator fatigue is eliminated.

Ask for demonstration of Rotor portable tools to see how they can cut *your* costs! Write for a free copy of Bulletin 53B.

Courtesy Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pennsylvania.

HAVE YOURS? 100-page handbook for portable air tool users. Request on your letterhead.



Rotor Air Tools: Assembly Tools • Drills • Small Wheel Grinders
Straight Grinders • Vertical Grinders • Scalers • Chippers • Rammers
Rotor High-Cycle Electric Tools: Grinders • Polishers • Sanders

ROTOR TOOLS
CLEVELAND, OHIO

A COORDINATED ELECTRICAL SYSTEM IS THE KEY TO IMPROVING PRODUCTIVITY AND PROFITS

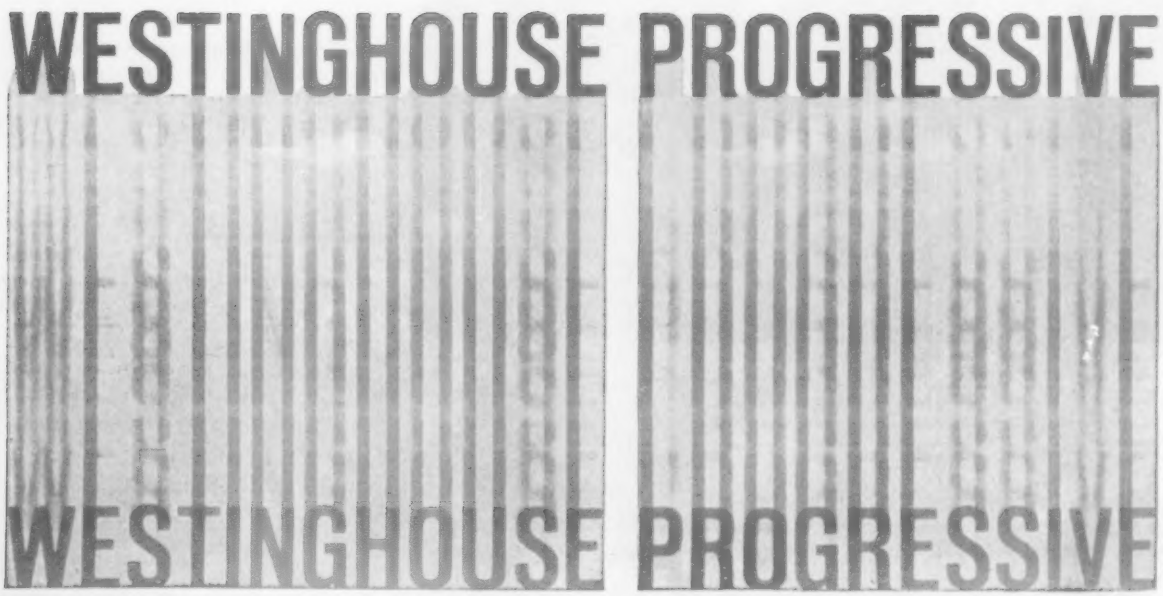
Westinghouse is ready now to help you plan economical steps to automatic production . . . to achieve your goals without over- or under-automating.

For many manufacturers, Westinghouse *Progressive Automation* has already proved a completely practical method of gaining improved product quality through step-by-step control of operations . . . a long-term plan with minimum capital cost for each step.

Now . . . automation step by step: Step-by-step automation can start with the modern Westinghouse controls, motors and drives at work in plants today. Each of these components was developed to achieve an immediate production objective . . . to control a single machine, a conveyor line or an entire installation. With this plan you then add other Westinghouse coordinating controls, all of which are compatible with those previously installed.

Benefits of long-term planning with minimum investment: First, you are meeting current production needs . . . improving productivity and/or raising product quality. Second, you are building a coordinated system . . . always ready for the next step in your long-range plan for automation. Your goal may eventually be overall production coordination under one master device . . . the Westinghouse industrial control computer.

Westinghouse—your one source for computers, controls and subsystems, and all equipment such as transformers, switchgear, motors, gearing and drives—will assume complete system responsibility.



AUTOMATION

Examples of Progressive Automation at work:

In the primary metals industry, installations of Westinghouse PRODAC* (programmed digital automatic control) have improved product quality and mill efficiency. This system has made possible automatic control of rolling mill functions, as well as monitoring all phases of the product and process by data accumulation systems.

Westinghouse industrial control computers are now being integrated with PRODAC to transform rolling mill equipment into a completely automatic unit. Three such systems are on order and underway.

In the paper industry, PULSETTER*, an automatic digital control system, makes possible new standards of accuracy and product quality in paper production.

In the chemical processing industries, Westinghouse provides OPCON* which experiments, then finds and controls optimum production efficiency.

Let us know your objectives. Westinghouse is prepared to work out a long-range plan of progressive automation to provide your plant with the controls and other devices necessary to improve production. We are prepared to recommend, furnish, install . . . and maintain . . . all equipment to fulfill that plan. Call your local Westinghouse representative for complete information on *Progressive Automation*.

*Trade-Marks

Westinghouse Progressive Automation can help you Power-Up for Profit . . . Electrically

J-96139

YOU CAN BE SURE...IF IT'S Westinghouse

TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

A beauty of a buy!
B D
Black & Decker
25
New High Styled Heavy-Duty
BLACK & DECKER VACUUM CLEANERS

Black & Decker Heavy Duty Vacuum Cleaners designed to suit your every need

Take the new No. 25 Heavy-Duty, for example. Here's *whisper-quiet* cleaning in a new concept of industrial vacuuming. The 25's swivel top permits cleaning a 15′ circle without moving the vacuum. And when the job's done just throw away the disposable bag! With power to spare the No. 25 is the most compact heavy-duty vacuum on the market.

Other models, ideal for general office, factory and furnace room use, are the No. 35 (⅞ bushel capacity); No. 65 for wet and dry cleaning; No. 95 for extra capacity and power. No. 55 for super capacity (50 gallons); and No. 648, designed for efficient furnace cleaning.

Whatever your cleaning needs call on B&D power, capacity, quietness. See the line soon. Mail coupon for free demonstration.

Capacity plus Power . . . No. 95

Super-Capacity Cleaning . . . No. 55

50th YEAR

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker®

QUALITY ELECTRIC TOOLS

For more facts Circle 399 on Reader Service Card

See Tools-Electric -Yellow Pages-for Service & Sales

THE BLACK & DECKER MFG. CO., Dept. 0706
Towson 4, Maryland (In Canada: Brockville, Ont.)

☐ Please arrange a demonstration of _____
☐ Please send additional information on _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

☐ Drills

☐ Saws

☐ Screwdriver

☐ Belt Sanders

"Pinkerton's screen their guards
much more carefully than we ever did."

PINKERTON'S, THE WATCHWORD FOR BUSINESS AND INDUSTRY

With over 100 years' experience, and by far the largest organization, Pinkerton's can provide the effective, economical security service required by modern businesses under today's conditions. Effective, because it is expertly supervised. Economical—often 20% below the cost of maintaining your own security guard—because Pinkerton's surveys your needs and tailors security measures to meet them, including, when possible, the latest electronic protective devices as well as trained, supervised guards. For further information, send for our security brochure.

Pinkerton's National Detective Agency, Inc. **100 Church Street, New York 7, N.Y.** **45 offices coast to coast**

Find Us Fast In The Yellow Pages

For more facts Circle 400 on Reader Service Card

Pyrene-C-O-Two

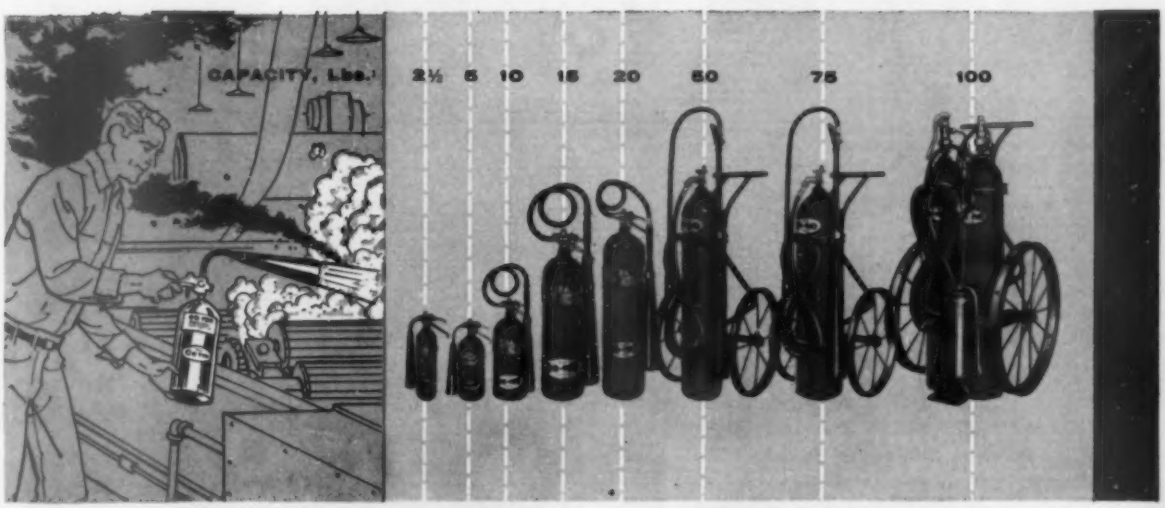
eight sizes...CARBON DIOXIDE EXTINGUISHERS

to combat flammable liquid and electrical fires

To protect your plant against all flammable liquid and electrical fire hazards, Pyrene-C-O-Two distributors carry a complete size range of carbon dioxide extinguishers. Each unit has been awarded a high U.L. rating and also is approved by Factory Mutual.

Hand portable models are available in 2½, 5, 10, 15, and 20 lb. units. Their exclusive Squeeze-Grip valve makes operation simple and quick . . . just pull the lock pin and squeeze the lever to open; release to close. Pressurized carbon dioxide snuffs out flames in seconds! Where fire hazards call for mobile extinguishing equipment, you can choose from 50, 75 and 100 lb. wheeled portable models. Each is equipped with horn, long hose and easily operated valves . . . available with either steel wheels or rubber tires. Carbon dioxide extinguishers are excellent for industry because carbon dioxide will not damage machinery, equipment, woodwork or fabrics.

EVERY MODEL CARRIES HIGHEST UL RATING!



Your Pyrene-C-O-Two distributor will help you make your carbon dioxide extinguisher selections . . . or he can also show you a complete line of liquid agent or dry chemical extinguishers. Look for his local listing in your Yellow Pages under "Fire Protection Equipment."

Pyrene C-O-TWO products of THE FYR-FYTER COMPANY, Dayton 1, Ohio

Branches: Atlanta, Baltimore, Boston, Chicago, Dallas, Dayton, Detroit, Los Angeles, New York, Newark, Philadelphia, Pittsburgh, Portland, Rochester, San Francisco, Toronto (Ontario). Representatives and Distributors in all principal cities.

For more facts Circle 401 on Reader Service Card

HAULS OF

Hoisting Millions of Beers
—straight up—with never a slip

At the giant Anheuser-Busch brewery, this pair of U.S. SteepGrade Conveyor Belts lifts 16-oz. cans of beer *at a 90-degree angle.*

"No other belt could have accomplished better performance. It's nothing short of spectacular," says the manager of the brewery.

As the 1-lb. cans come from the pasteurizer slippery and wet, they roll onto the vertical can conveyor where SteepGrade carries them straight up and onto an incline to the carton-filling machine. Cans don't slip at all, even when the conveyor is stopped.

The secret is SteepGrade's exclusive "gripper cleat" construction—a molded, integral part of the belt itself. These thousands of "gripper cleats" hold the cans firmly, yet gently. This means far less pressure, far less belt speed is required. Damage to cans and print smearing is eliminated. And the more efficient operation saves electric power, lengthens belt life.

HERE are on-the-job stories of three United States Rubber Conveyor Belts, taken from "U.S." belt records in package handling.

These belts are just some of the "U.S." standouts which demonstrate, year after year, why "U.S." is the world's largest producer of conveyor belts.

For steady, day-in-and-day-out dependability in conveyor belting, it always pays you to secure the advantages of "U.S." Engineering. "U.S." Engineers work directly with "U.S." Distributors or original equipment manufacturers to assure their obtaining the right belt recommendations for each type of conveying.

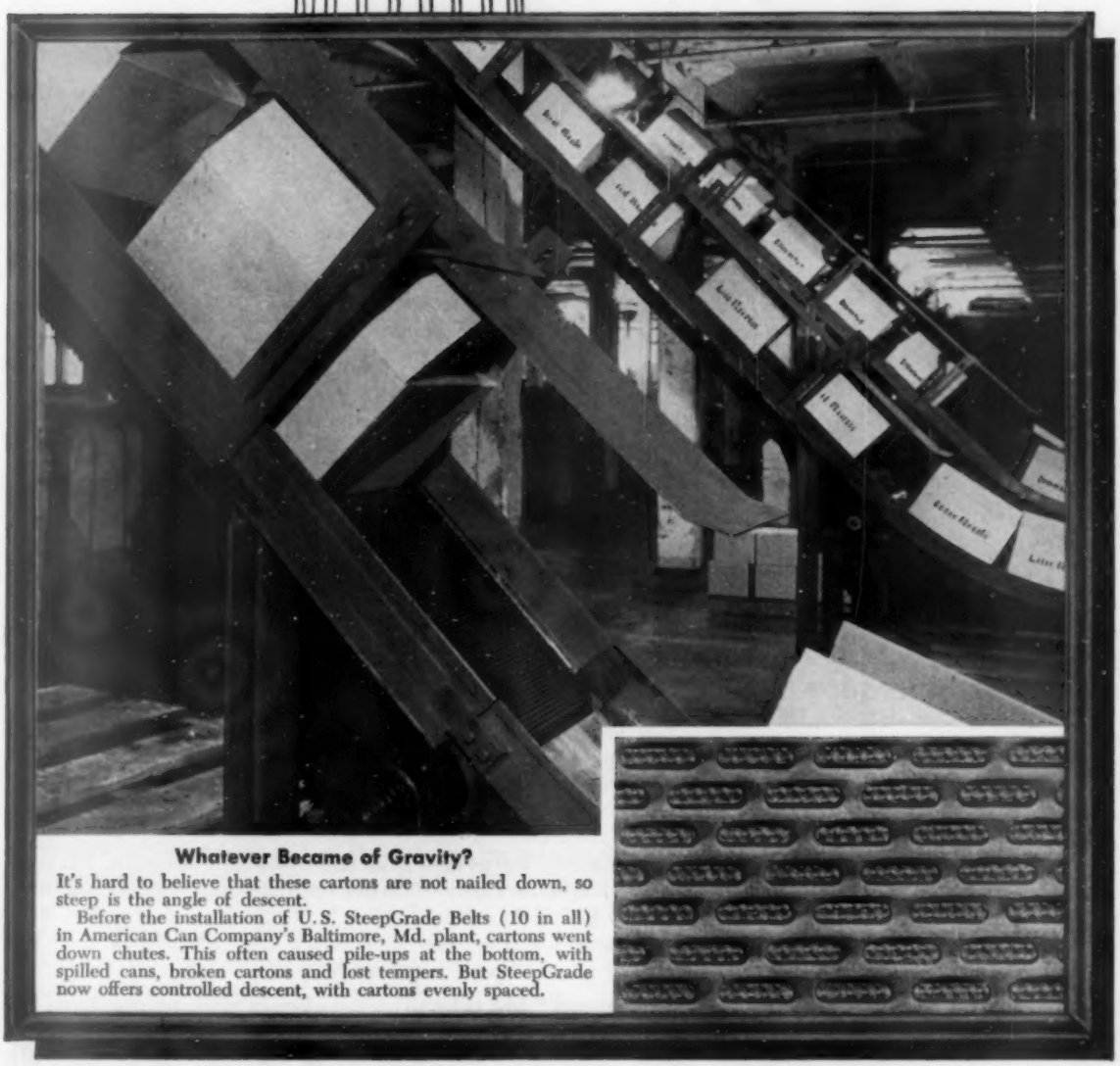
The most comprehensive belting engineering information in the industry is available through your "U.S." Distributor. It will pay you to check with him.

U.S. STEEPGRADE,
serving the world's great airlines

Next time you're at an airport chances are you'll be able to see U.S. SteepGrade Conveyor Belting in action. You'll see it carrying cargoes on steep inclines and declines—as steep as 45 degrees. It speeds up loading, reduces manual labor for today's leading airlines.

Again notice the gripper cleats in SteepGrade. They cannot be torn off by heavy boxes. SteepGrade is weather resistant, will not stiffen in extremely low temperatures and is self-cleaning.

FAME



Whatever Became of Gravity?

It's hard to believe that these cartons are not nailed down, so steep is the angle of descent.

Before the installation of U.S. SteepGrade Belts (10 in all) in American Can Company's Baltimore, Md. plant, cartons went down chutes. This often caused pile-ups at the bottom, with spilled cans, broken cartons and lost tempers. But SteepGrade now offers controlled descent, with cartons evenly spaced.

Mechanical Goods Division

United States Rubber

"WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS"

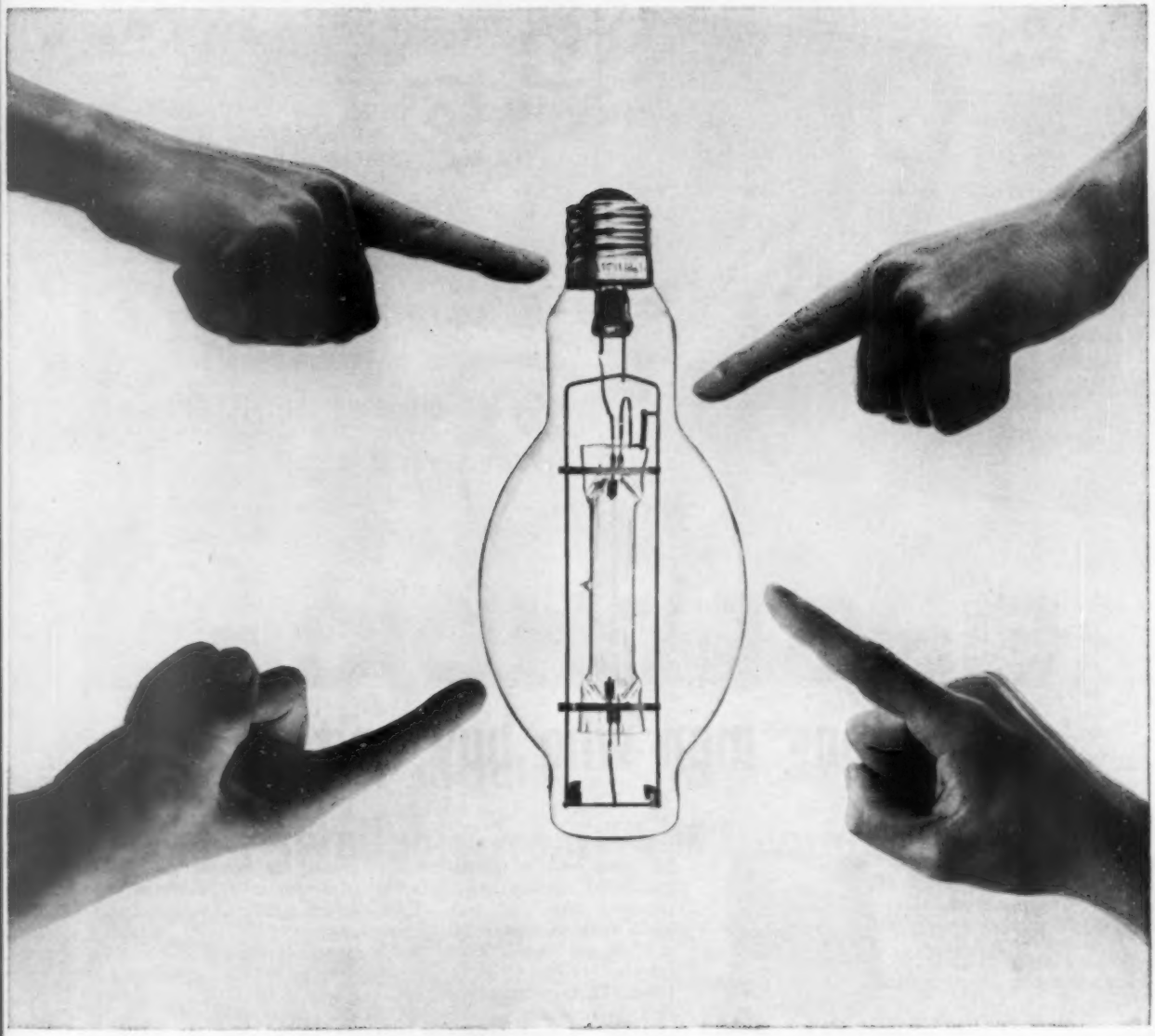
Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

For more facts Circle 402 on Reader Service Card.

Mercury lamps may look alike

These Mercury lamps look alike and cost about the same, but one—the Westinghouse Lamp—will deliver more light initially and maintain this high light output longer. It is your most economical choice for industrial and commercial lighting and incorporates all 4 outstanding improvements listed below.

1. Lifeguard™ arc tube to improve lumen maintenance. Even after 10,000 hours of use, these lamps will still give 85% of their initial light output. *This means that 2½ years after you install Westinghouse Mercury Lamps, your plant or streets will have almost the same high level of light as when the lamps were new!*



. . . but four differences make one a better buy!

2. New design electrodes lock in the emission material and insure long life and easier starting.

3. Weather Duty™ construction. Special glass is resistant to thermal shock and corrosive fumes. Moisture, industrial fumes, even snow and rain can't harm these Westinghouse Mercury Lamps.

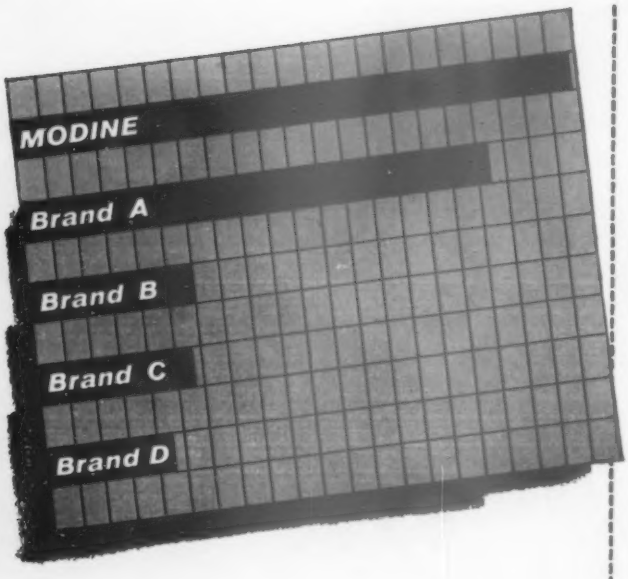
4. Hi-temp silicone cement holds bases tight for life . . . actually gets stronger as the lamps burn. No drop-outs. Westinghouse even date-codes its mercury lamps so you can check performance.

No matter what type or wattage of mercury lamps you use, you will get more value and light for your money—plus longer, trouble-free service—by specifying and insisting on Westinghouse Mercury Lamps. Westinghouse makes the most complete line of mercury lamps in the industry . . . 100 to 3000 watt sizes . . . in clear, color-corrected and reflector types. Contact your authorized Westinghouse lamp agent or nearest Westinghouse sales office.

YOU CAN BE SURE...IF IT'S **Westinghouse**

WESTINGHOUSE LAMP DIVISION, Westinghouse Electric Corporation, Bloomfield, N. J.

For more facts Circle 403 on Reader Service Card



The chart represents the results of a steam and hot water unit heater survey made by a leading industrial magazine. In answer to the question "Which brand do you prefer?", Modine was a solid...

FIRST CHOICE

among men who buy unit heaters

HORIZONTAL
Can be direct-from-pipe suspended . . . without other supports. Vertical louvers may be added for complete directional control. 24 sizes.

VERTICAL
Available in 28 sizes . . . choice of 4 air deflectors. Depending upon size selected, mounting height may vary from 10 to 60 feet.

POWER-THROW®
For hard-to-heat locations. High-velocity discharge assures exceptionally long heat-throw . . . up to 140 feet. Offered in 10 sizes.

For over thirty years, Modine steam and hot water unit heaters have been a consistent first choice for commercial and industrial applications. They're ideal for new buildings or modernization . . . pay off in perfect comfort, at low fuel costs, with minimum maintenance.

Here are just a few of the features of Modine's line: attractive styling; three distinct designs . . . horizontal, vertical, Power-Throw; lightweight, yet extremely durable construction; high capacity on steam or hot water systems; die-formed casings; a complete line of low-outlet-temperature models for high pressure systems; extra-heavy die-formed fins for added strength and maximum heat transfer; vertical fin design that discourages accumulation of dust and dirt.

CATALOG 158 *contains full details. See your distributor or write Modine Manufacturing Co., 1505 DeKoven Ave., Racine, Wisconsin.*

In Canada: Sarco Canada, Ltd., Toronto, Ont.

Immediate delivery from local stock!
Modine wholesalers are located in all principal cities. Call the Modine representative nearest you . . . he's listed in the yellow pages.

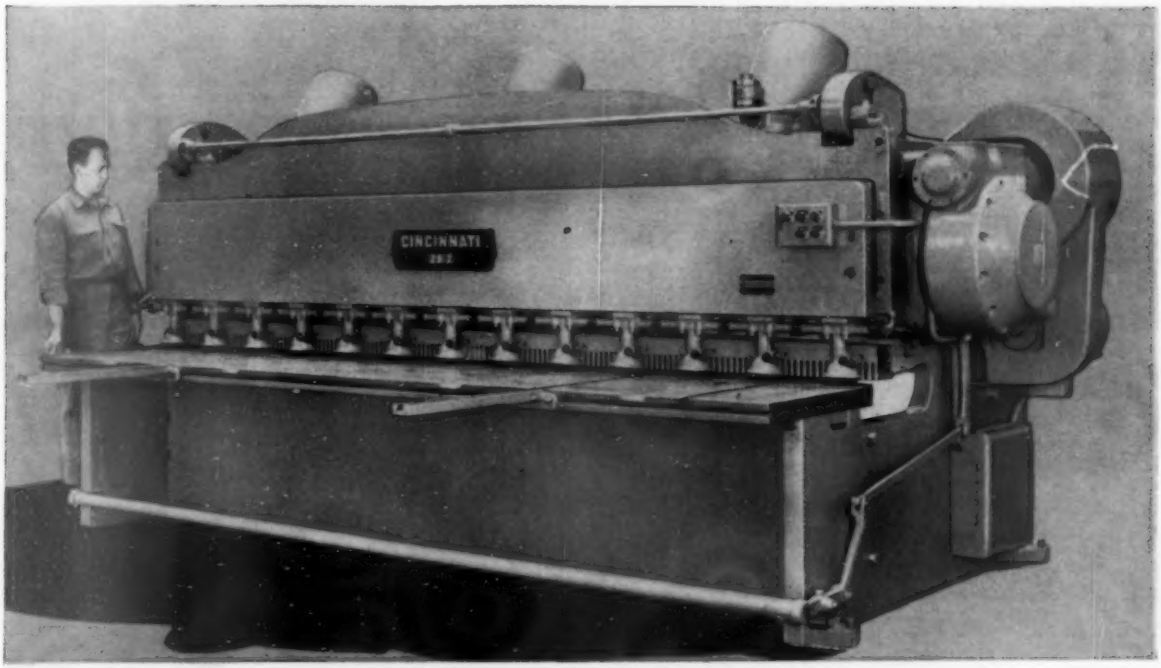
SU-1388

Also from the world's most complete unit heating line

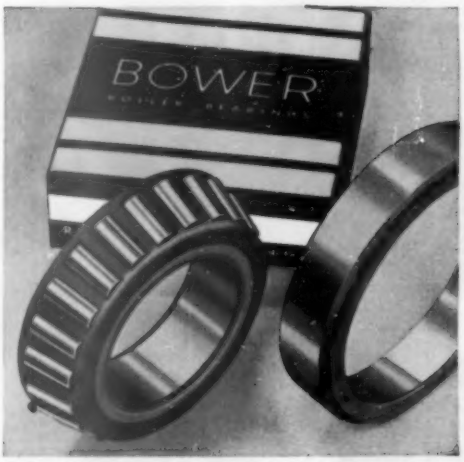
Modine
FIRST NAME IN UNIT HEATING

For more facts Circle 404 on Reader Service Card

Better products, *faster*, from your Bearing Specialist:



Common sense dictates . . . "Replace with Bower"— readily available from your Bearing Specialist!



Both manufacturers of heavy-duty metal-working machines and maintenance men agree . . . Bower roller bearings keep production up to peak levels

Bower roller bearings take on heavy assignments with ease where load stresses are high and an exacting degree of accuracy is required. To maintain an absolute minimum of running friction, tolerances for certain bearing parts are held uniformly to within millionths of an inch, measured only with super-precision electronic gauging equipment.

You will find these better built Bower tapered and straight roller bearings working round the clock in practically every type of modern machinery. So, it's just common sense to call your Bearing Specialist when you need replacements of any kind. He'll see you get *fast* delivery.

BOWER ROLLER BEARINGS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

BEARING BOWER ROLLER BEARINGS SERVICE

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RED, HOT AND STANDARD

NEW

With the Big 7 features to give you better engine performance and lower maintenance costs

Here's how you get better engine performance

Balanced volatility gives you maximum usable power. It allows PREMIER Diesel Fuel to deliver the most possible BTU's of energy without sacrificing clean-burning qualities, meanwhile assuring low smoke and exhaust odor. PREMIER's low pour point means free flow in cold weather. PREMIER's cetane means that engines start easily, idle smoothly, deliver full performance under all operating conditions.

PREMIER's anti-rust additive minimizes an important diesel engine worry—injector sticking. PREMIER Diesel Fuel is handled only by Standard Oil from refinery to you, thus the chance of fuel contamination is virtually eliminated.

Here's how you get lower maintenance costs

Deposits caused by excessive sulfur in fuel can damage the engine and increase maintenance costs. PREMIER's low sulfur content means reduced engine wear. Additives inhibit rust of engine parts and storage facilities. PREMIER's just-right viscosity results in effective injector lubrication and the prevention of leakage. Because of this you don't waste fuel or power.

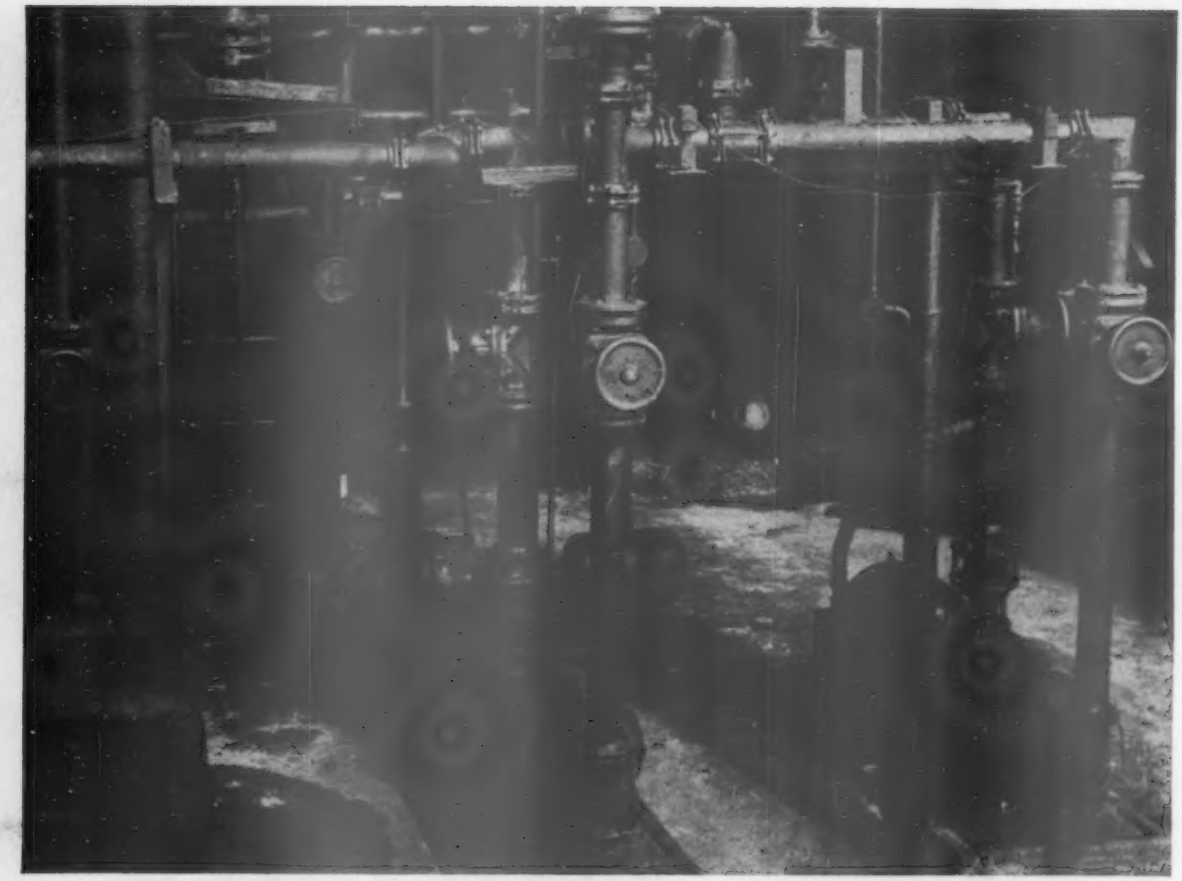
Get all the facts about new PREMIER Diesel Fuel. Call your nearby Standard Oil office. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

PREMIER DIESEL FUEL

Here are the 7 big features

1. Anti-rust additive.
2. Balanced volatility—for full power and clean burning.
3. Cetane—for easy starting, good performance.
4. Free flowing—even in cold weather.
5. Low sulfur—less wear, reduced deposits.
6. Lubricates and seals injectors.
7. Distinctive red color.

You expect more from STANDARD *and you get it!*



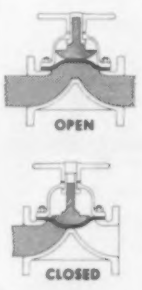
Glass-lined Grinnell-Saunders Valves, with Teflon Diaphragms, on benzene hexachloride lines at Diamond Alkali's Greens Bayou, Texas, plant. Hundreds of other Grinnell Diaphragm Valves are used in other areas of the plant.

How a manufacturer of benzene hexachloride solved a serious valve leakage problem

Valving at Diamond Alkali's Greens Bayou, Texas, plant had become expensive. Leakage of a product containing 30% to 40% benzene and free chlorine released fumes and caused rapid corrosion of the metal parts of the valves used previously, as well as of adjacent equipment.

This problem was corrected when Grinnell-Saunders Diaphragm Valves were used. The first replacement of any part of the Grinnell Valves did not occur for two years, and this was the diaphragm *only*. The former valves had to be *completely* replaced every one to two months! Bodies of the Grinnell valves lasted four years. In short, when Grinnell-Saunders Diaphragm Valves were installed, stem leaks ceased; corrosion was eliminated; and downtime to install new valves was practically ended.

For further facts about Grinnell-Saunders Valves, see Grinnell's insert in Chemical Engineering Catalog, or Sweet's Plant Engineering File — or write directly to Grinnell Company, Providence 1, Rhode Island.



- Diaphragm lifts high for streamline flow in either direction
- Diaphragm presses tightly to effect positive closure
- No packing glands to need attention
- Diaphragm easily replaced without removing valve body from the line
- Wide choice of body, lining and diaphragm materials

GRINNELL-SAUNDERS DIAPHRAGM VALVES

GRINNELL COMPANY, PROVIDENCE 1, R. I. • BRANCH WAREHOUSES AND DISTRIBUTORS FROM COAST TO COAST
PIPE FITTINGS • VALVES • PIPE HANGERS • PREFABRICATED PIPING • UNIT HEATERS • PIPING SPECIALTIES

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EXPLORE INNER SPACE...

Tap the full resources of your plant's productive capacity. Discover the unused ceiling space that can be put to use with American Monorail.

Monorail systems reduce floor traffic and make more space available for workers and machines.

A great variety of equipment is available and can be engineered to solve your problem. We've specialized in this equipment for 34 years and your installation will be guaranteed.

Write for Free Booklet with 56 pages, 99 photos.

ENGINEERED MATERIALS HANDLING

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RUST-OLEUM.

NEW COLOR

HORIZONS System

STOPS RUST AND PROVIDES LASTING BEAUTY

Gone are the days when color was used for the sake of color alone. Today, color is functional—helping to improve morale and increase efficiency—serving to color-code and mark safety areas, etc. The Rust-Oleum New Color Horizons System goes even further. It combines four important factors (1) the ability to stop rust, (2) smart, modern color harmony, (3) the durability to last and last, (4) ease of application that saves time, money, and metal. See how this system can bring lasting beauty to your plant, machinery, equipment, tanks, fences, etc. Your Rust-Oleum Industrial Distributor, with your Rust-Oleum Factory Specialist, will be happy to survey your plant and provide complete recommendations. Prompt delivery is assured from Industrial Distributor stocks in all principal cities of the U.S., Canada, and many countries around the world.

Faced with coating problems like these? Heat resistance, water resistance, chemical resistance, floors, galvanized metal, coatings that will dry in less than thirty minutes? Rust-Oleum, in its various systems, can be your answer. Call your Rust-Oleum Industrial Distributor, or write for the facts.

Apply Rust-Oleum 769 Damp-Proof Red Primer directly over sound, rusted surfaces to STOP RUST and cut maintenance costs

Just scrape and wirebrush to remove rust scale and loose rust—then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust. Its **specially-processed** fish oil vehicle penetrates rust to bare metal as proved in radioactive tracing studies. You save time and money, as costly surface preparations are usually reduced.

RUST-OLEUM®

See our catalog in Sweet's.

STOPS RUST!®

Distinctive as your own fingerprint.
There are imitations,
but only **one** Rust-Oleum.
Accept no substitute.

PROVED THROUGHOUT INDUSTRY FOR OVER THIRTY-FIVE YEARS

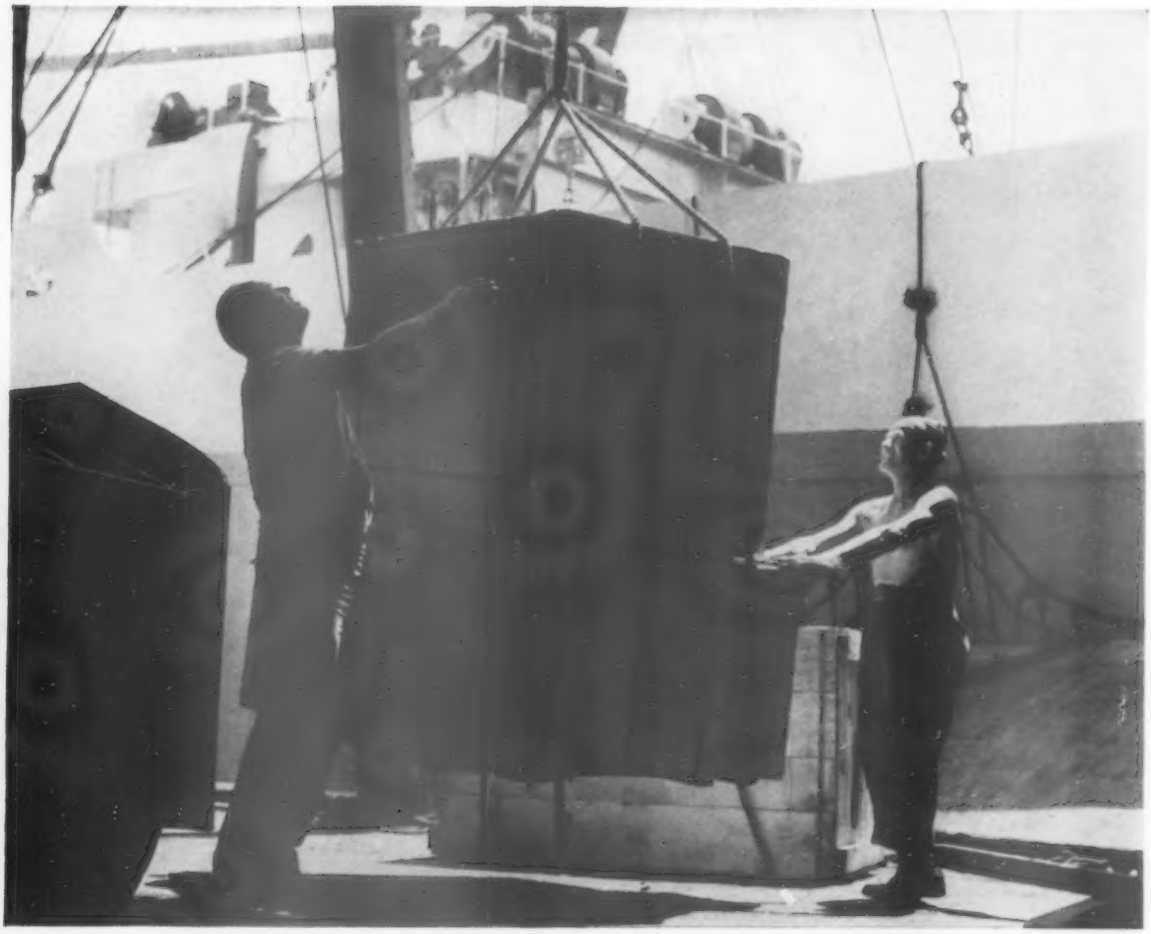
You take the brush! Try a free test sample!

ATTACH TO YOUR LETTERHEAD

RUST-OLEUM CORPORATION
2984 Oakton Street • Evanston, Illinois

At no cost or obligation, please send me:

- ☐ New full-color catalog on New Color Horizons System and specialized Rust-Oleum systems, including color charts and applications.
- ☐ FREE TEST SAMPLE of Rust-Oleum 769 Damp-Proof Red Primer.
- ☐ Please have your representative contact us to discuss a plant survey.



There goes another consignment of red ink

The salesman spent a week in Bermuda on his commission. The front office rejoiced. But the company lost money.

What was wrong? Factory overhead.

This company has a plant-wide burden rate. All costs are based on it. In some departments, actual overhead is *less* than the standard rate. Profits are high. In others—notably those which turned out these assemblies—actual overhead *exceeds* the standard rate. Prices don't cover it. Profits are seldom—if ever.

How different with Automatic Keysort Data Processing! With Automatic Keysort, the Plant Manager can pinpoint burden charges by *department* . . . and prices may be set to allow for profit in each operation. Because plant operating figures are reported *on time*, unrealistic overhead rates can be quickly spotted.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Automatic Keysort will give you all the fast, accurate information you need for modern management control of every factory operation. And at remarkably low cost.

To learn more about how Automatic Keysort Data Processing can fulfill *your* need for timely, comprehensive facts and figures, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, New York for brochure FS-43.

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NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

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AUTOMATIC SLASHES GAS LIFT TRUCK OPERATING COSTS 3 WAYS

1 CUTS OUT-OF-POCKET COSTS

Savings up to 30% on fuel costs achieved through use of a simplified electric power train. New 3-way adjustable seat increases driver efficiency...reduces fatigue. Simplified balanced design saves on downtime.

2 CUTS MAINTENANCE COSTS

Hydraulic pump life increased by 50%. Oversize brakes last up to 30% longer and are adjustable without removing wheels. Advanced-design roller mounting increases life of uprights. No clutch or hydraulic torque converter to cause trouble.

3 INITIAL COST REDUCED

No longer a premium-priced truck, but priced competitively with trucks which use hydraulic torque converters.

LEARN MORE about how Automatic's gas-operated, electric-driven trucks can slash your operating costs. Available in capacities 3,000 to 10,000 lbs. with cushion tires, 3,000 to 8,000 lbs. with pneumatic tires. Write today.

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Please send me complete details about Automatic Gas-Operated, Electric-Driven Lift Trucks, in capacities of_____lbs._____lbs._____lbs.

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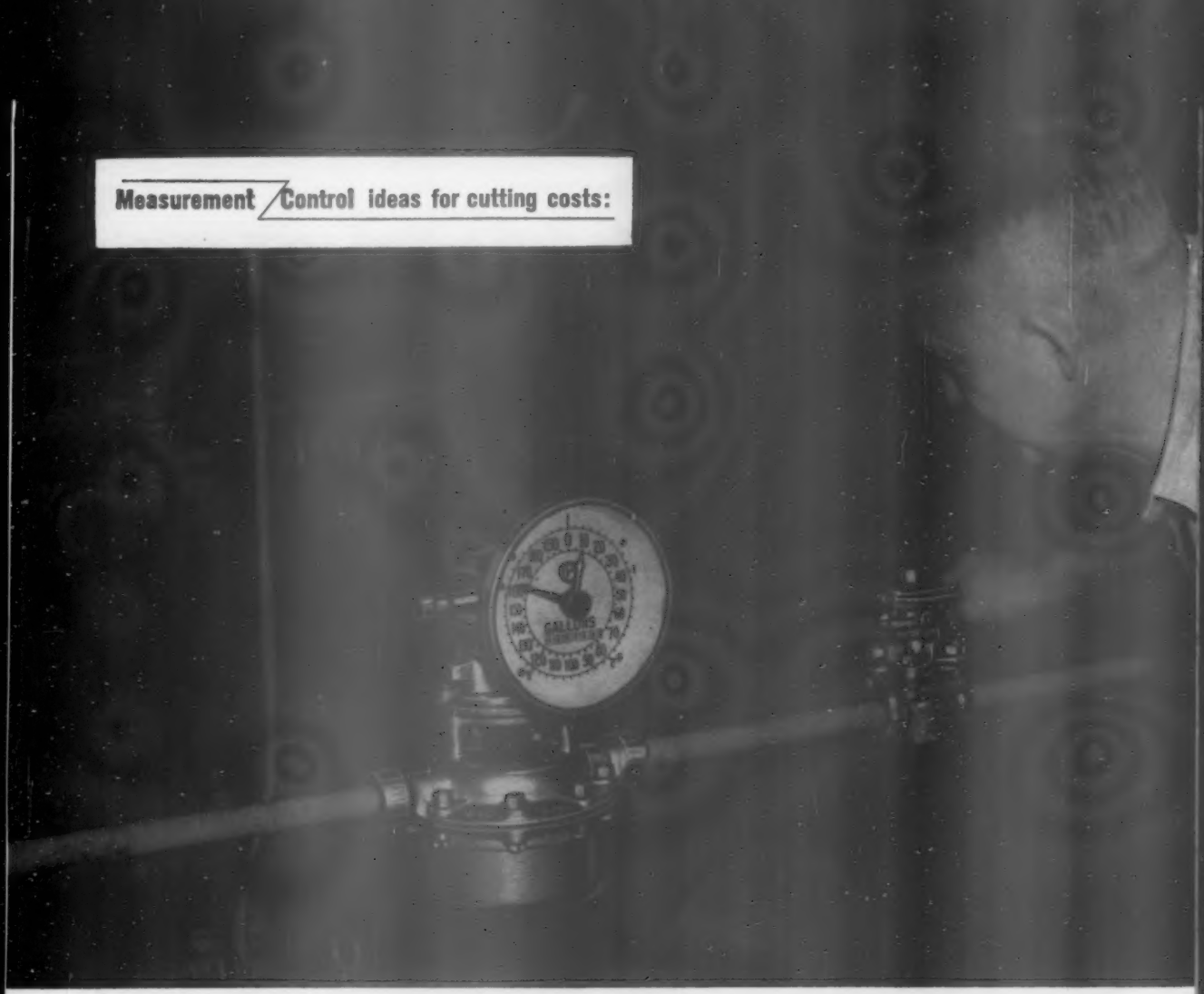


HOW TO SAVE TAX DOLLARS THESE DAYS

Profit these days always has to be concerned with the phrase "after taxes." At a large process plant sewage taxes were being paid on the basis of all water consumed. But a sizable portion of this water was actually used as "raw material" for finished products and never reached the sewage lines. A Rockwell engineer suggested putting liquid meters* on process units to accurately record the water consumed in production. By proving that large quantities of water going into the plant were not discharged as waste, sewage tax bills were cut drastically.

This is just one example of the many ways a Rockwell field engineer can help you track down new and different ways to cut plant costs with measurement and flow control devices. Rockwell has more experience than any other single source for this kind of cost cutting. That's because Rockwell, as the world's largest manufacturer of a complete line of meters, valves and regulators, has been asked to solve more problems.

Wherever liquids, gases or slurries flow through pipes in your plant, you probably can save time, money or materials with new or improved methods of measurement and control. It's easy to find these cost cutting opportunities—just have a Rockwell field engineer visit your plant by sending in the coupon today.

* *Rockwell makes meters to measure a variety of liquids—water, oil, chemicals and other industrial fluids.*

ROCKWELL

The leading single source for Measurement / Control products and ideas

For more facts Circle 412 on Reader Service Card

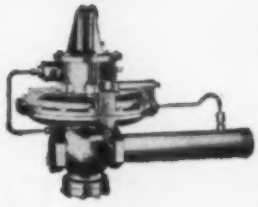
"IN-PLANT" METERING:

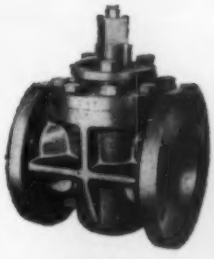
LIQUIDS AND GASES

Rockwell gas and liquid meters, properly applied, can improve quality control, sharpen cost control, and prevent waste in almost every plant department. A Rockwell Field Engineer can help you find *where* meters will cut costs . . . and Rockwell has a complete line of meters to measure practically anything that will flow through pipe.

CONTROLLING PIPED MATERIAL:

LIQUIDS AND GASES





More efficient control of all the material flowing through pipes in your plant is a positive step in cutting costs. There are new applications and new ideas for using gas pressure regulators and valves that will stop wasteful, inefficient, and dangerous handling of fuels, production fluids, and products. A Rockwell Field Engineer can show you *where* and *how*.

HOW MUCH COULD YOU SAVE?

There is hardly a plant anywhere—including yours—where the right application of the right measurement and control methods and equipment won't produce savings many times the modest cost involved. Certainly it's worth investigating—especially since it will cost you nothing to talk to a Rockwell field engineer. Simply mail the coupon now.

SEND COUPON TODAY

MEASUREMENT AND CONTROL DEVICES

all fine products by

ROCKWELL

Rockwell Manufacturing Company, Dept. MC1F, Pittsburgh 8, Pa.

☐ Please have a Rockwell Field Engineer call me for an appointment.

Please send literature on ☐ Controlling gas pressures; ☐ Valving gases, liquids and slurries; ☐ Measuring liquids; ☐ Measuring gases.

I am concerned primarily with ☐ Light & Heavy Metal Fabricating ☐ Basic Chemical Production ☐ Chemical Processing ☐ Food, Drugs & Tobacco ☐ General Manufacturing Operations ☐ Petroleum Processing

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if you use

PORTABLE POWER TOOLS

...you need these

Studies show that operation of inefficient portable power tools probably fritters away more production . . . wastes more payroll dollars than anything else in industry today. Yet, even in the best-run plants, this fact is often ignored or overlooked by an otherwise-alert management.

How much production are *you* losing this way? Just how efficient are your portable tools, how do you find out, and what's the most economical way to keep them at peak performance?

You can get all the answers in Ingersoll-Rand's new illustrated guidebook to more efficient power tool operation. Write for your free copy today! With it you'll get a handy, easy-to-use *Dividend Computer* for estimating how big a Dividend on Payroll Dollars you can earn in your plant in just one year with Planned Annual Retooling. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

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increases output per man

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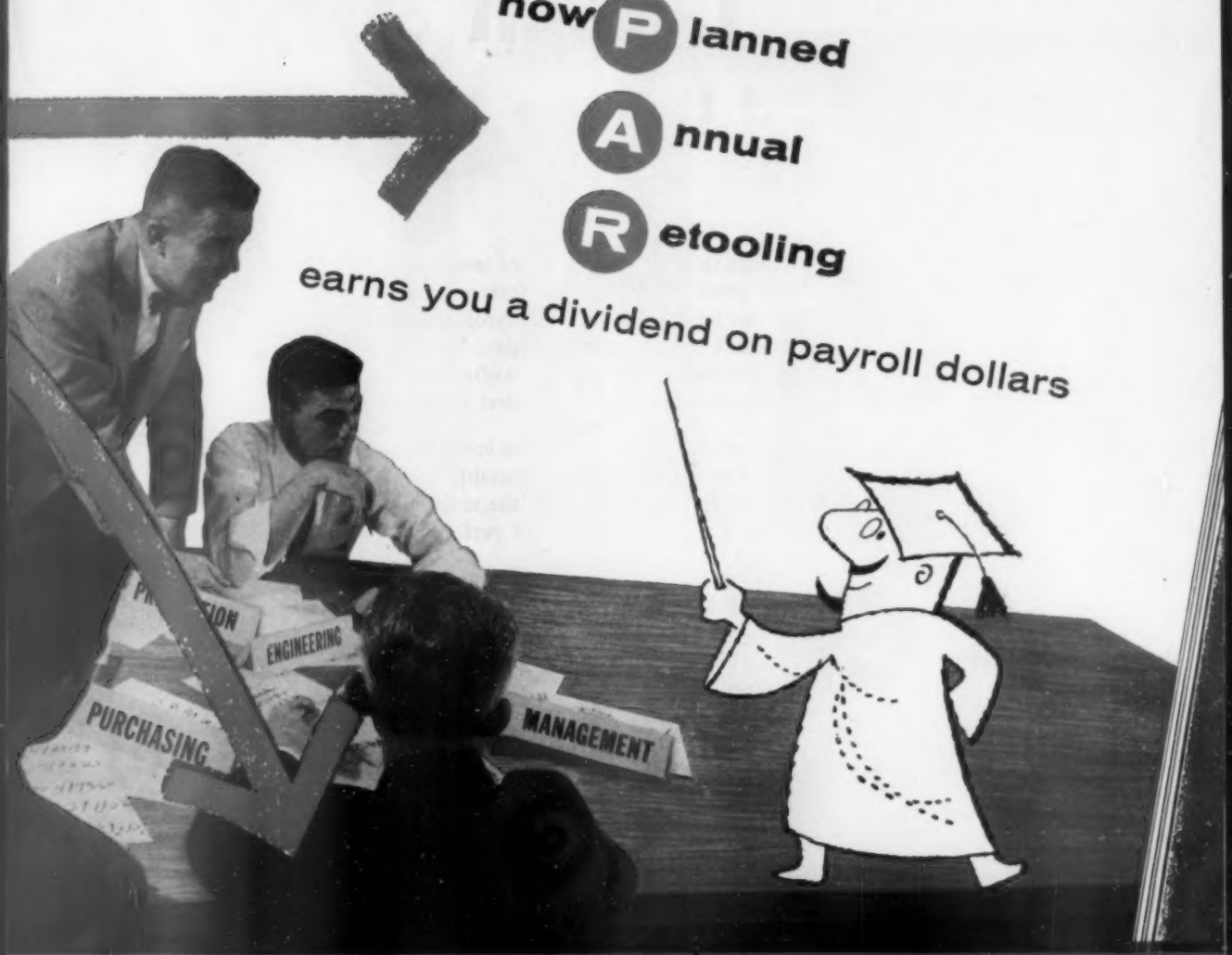

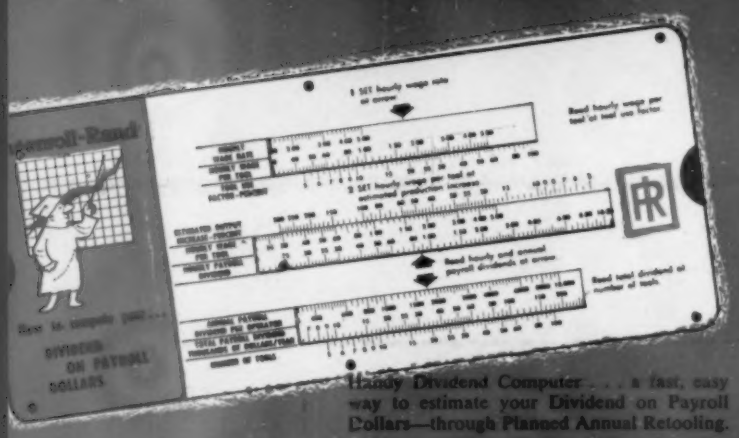

Handy Dividend Computer . . . a fast, easy way to estimate your Dividend on Payroll Dollars—through Planned Annual Retooling.

MAIL COUPON TODAY!

Ingersoll-Rand Co.
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New York 4, N. Y.

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Where PRODUCT PURITY is important, protection gets a hand from Alcoa

When protection against contamination from *any* source is vital, take a look at what Alcoa aluminum electrical rigid conduit offers. ¶ It needs *no* protective coating, because it forms its own—an oxide film that repairs itself when damaged. ¶ It's corrosion-resistant—stands up particularly well against acids commonly present in food plants: citric, acetic, tannic. And the compounds that might form when aluminum is used are in most cases *nontoxic*, completely safe. ¶ What else? Aluminum is lightweight (weighs about 1/3 as much as steel), so it's easier to install. Alcoa conduit is also nonmagnetic, nonsparking, and neat appearing. ¶ Consider all costs—initial, installation, maintenance—plus long service and you'll see why Alcoa aluminum conduit is a sound investment. ¶ For full details, contact one of our nearby representatives. Or write to Rome Cable Division of Alcoa, Dept. 21-60, Rome, New York.

◀ ADDED PROTECTION against product contamination is provided by Alcoa aluminum conduit. It needs no protective coating, resists corrosion, and is nontoxic.

ROME CABLE
DIVISION OF **ALCOA**

New LOW COST PER YEAR for maintenance painting with METALASTIC®!

Fortify a primer with FOUR protective pigments. Build in special "wetting" action to saturate and seal rough surfaces. Cover with tough, elastic, premium enamel made with chemical and fume-resistant pigments for *all* colors—and you have new, long-lasting protection for *any* exposed metal surface!

Sherwin-Williams METALASTIC Primer and METALASTIC Enamel incorporate new advances in paint chemistry that mean lower per-year costs for industrial maintenance painting, even under unfavorable conditions of application or surface preparation. New light, bright colors *stay* light and bright. Long-oil formulation insures long-lasting durability. And high-solids content gives longer-lasting high film build even on protruding edges and corners.

Get all the facts on METALASTIC—see the new METALASTIC colors! Call your local Sherwin-Williams Branch—in all principal cities. The Sherwin-Williams Co., Industrial Maintenance Division, Cleveland 1, Ohio, or Montreal, Canada.

☐ Send booklet "How To Save"
☐ Send more facts on METALASTIC

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Company_____
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How to Save SAFELY When Painting Your Plant
This free booklet tells how... shows *what* to use *where*. Send for it, together with more facts on METALASTIC.

SHERWIN-WILLIAMS
MAINTENANCE FINISHES

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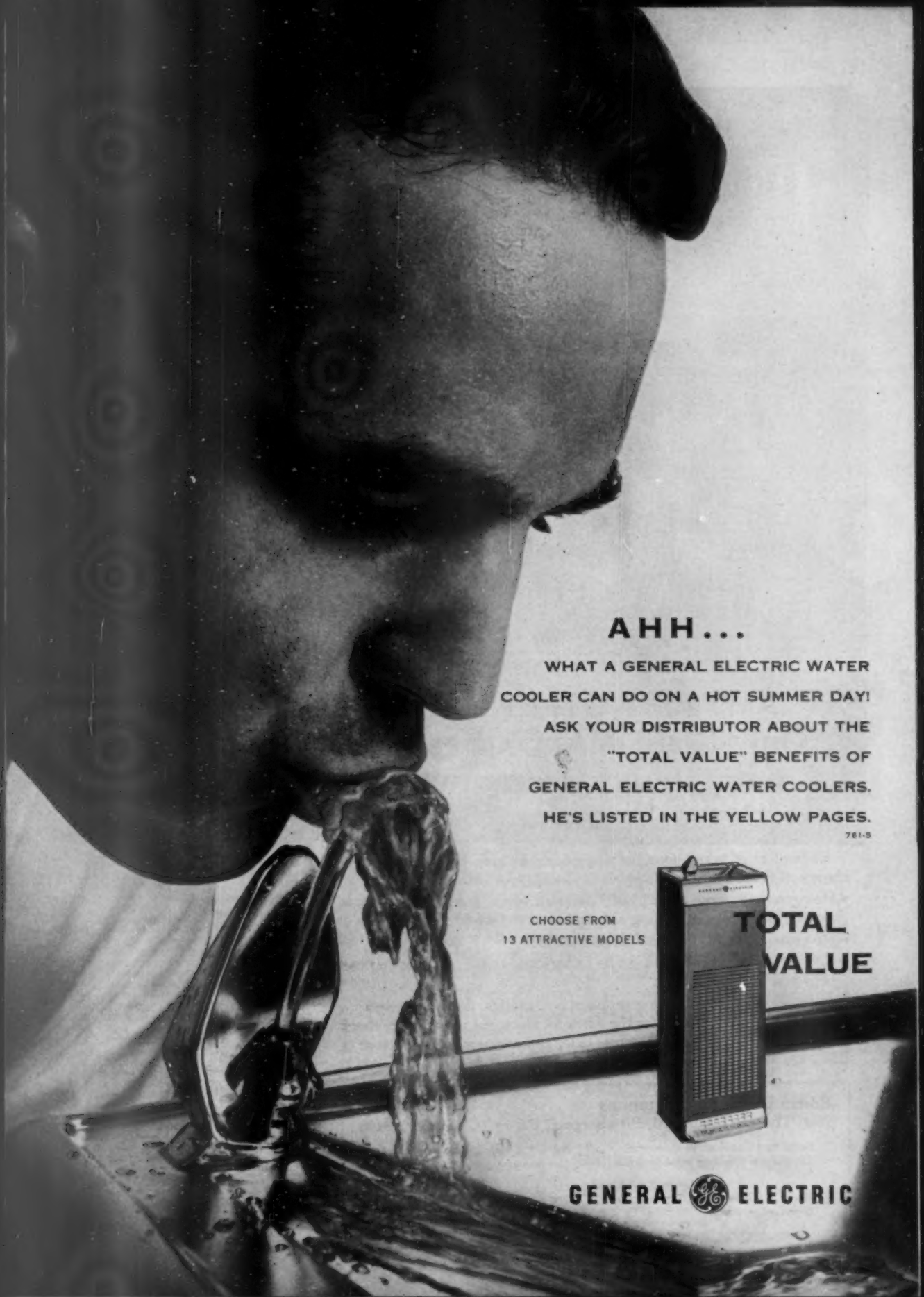
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TOTAL VALUE
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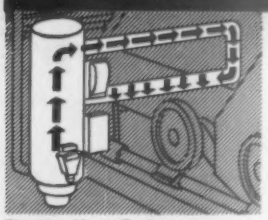
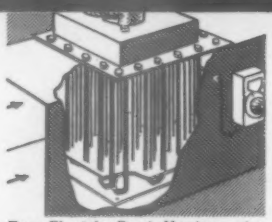
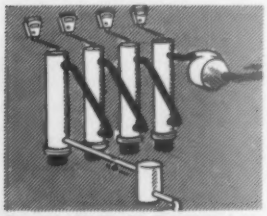
Call your CHROMALOX Man for heating answers



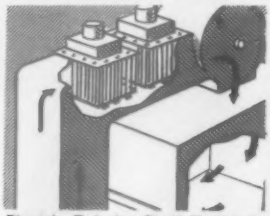
Electric Heat Exchanger superheats steam to 750°F for setting ink on printing press.



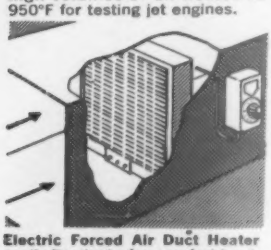
Two Electric Duct Heaters give fast heat-up and accurate temperatures in high velocity oven.



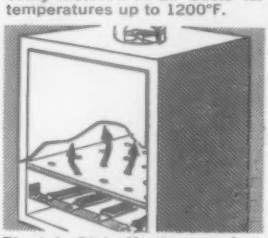
Electric Air Preheaters produce high volumes of air heated to 950°F for testing jet engines.



Electric Tubular Duct Heater is easily installed in air ducts for temperatures up to 1200°F.



Electric Forced Air Duct Heater easily fits ducts for comfort heating or process heat to 950°F.



Electric Strip Heaters are low-cost, uniform heat source for natural convection ovens to 750°F.

STEAM? AIR? OTHER GASES? ...Only CHROMALOX heats so many things, so many ways

There's one best way to do any job. And you get the best results only by using that one best method.

Regardless of what your heating problems may be . . . your best chance of finding the best answer is to call your Chromalox Man.

- He represents more than 15,000 different types, sizes and ratings of electric heaters and heating elements . . . the world's largest line.
- He orders from the world's largest stock.
- And he is a heating expert . . . he understands your problem and can help you find the answer.

No matter what your heating problem is . . . solids, liquids or gases . . . call your Chromalox Man for the efficient, electrical answer. Or, check the boxes below, write your name, title, and address at the bottom of this page and mail the coupon to us.

D1047

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☐ Send me Catalog 60 (General Industrial heating applications).

☐ Send me specific information on the heating problems I have outlined on the sheet attached.

☐ Have a Chromalox Representative contact me.

☐ Do not have a Chromalox Representative contact me.

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OMAHA, NEB.
Atlantic 7600
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(See Bala-Cynwyd, Pa.)
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CHROMALOX ELECTRIC HEAT

For more facts Circle 417 on Reader Service Card

ARO IS FIRST AGAIN!

BRINGS YOU A
TROLLEY CONVEYOR LUBRICATOR
That really works!

★ **AUTOMATIC**—lubricates while conveyor is in operation.

★ **DEPENDABLE**—it never misses a fitting.

★ **COST-SAVING** — self-amortizing.

Another major triumph for ARO engineering! This new ARO-developed trolley lubricator automatically lubricates all grease fittings on a conveyor—it never misses—it is air-powered, has floor-level control. The ARO lubricator is self-adjusting, completely self-contained, designed for fast, easy installation in existing trolley conveyors. Will handle standard conveyor wheels intermixed. No dripping. This unit cannot discharge lubricant unless coupler is properly connected to fitting. Avoids costly conveyor downtime, saves labor, money and time for you. Ask your ARO Distributor for full details, or write today for brochure.

The Aro Equipment Corporation
Bryan, Ohio
Aro of California, 3141 S. Grand Ave., Los Angeles 7, Calif.
Aro Equipment of Canada Ltd., Rexdale (Toronto), Ontario
Offices in All Principal Cities

ARO®

TROLLEY CONVEYOR LUBRICATORS
Also Air Tools, Air Hoists, Automation Tools

MORE VALUE FOR YOUR LARGE MOTOR INVESTMENT . . .

how Westinghouse F/A Motor design

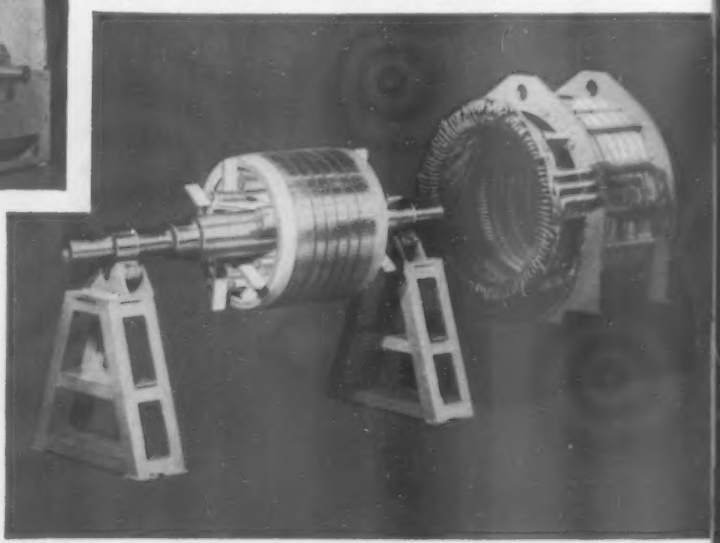
What's new in inspection procedures for large motors? Less of it . . . up to 75% in both time and dollars directly chargeable to this chore.

The reason Westinghouse can offer such unusual savings in inspection and maintenance is the revolutionary new F/A Motor design. For the first time, here is full accessibility coupled with the time-tested and -proved reliability of Westinghouse motor components. The motor housing is completely separate from the stator and can be removed in minutes for thorough visual inspection.

This degree of accessibility is impossible with conventional motors. As a consequence, the F/A Motor can be more thoroughly inspected and maintained, thus guaranteeing true value

Inspection of leads and connections is simple. There are no protruding conduit boxes; cable comes up through the base, leaving plenty of room for connecting motor leads.

Disassembly as complete as this is impossible in conventional motors. With the Westinghouse F/A Motor it *can* be done, and in only 90 minutes. Reassembly takes only 2 hours, for a total of 3½ hours for a complete dismantling.



For routine inspection of windings and bearings, simply remove the end panels (above). **For complete bearing inspection,** merely remove bearing cap, top bearing shell and oil ring; then bottom bearing shell rolls out for easy inspection (right). **For more thorough inspection,** end covers, panels and air shields can be removed in only 38 minutes and replaced in 56—with the motor still in running condition!

YOU CAN BE SURE...IF IT'S

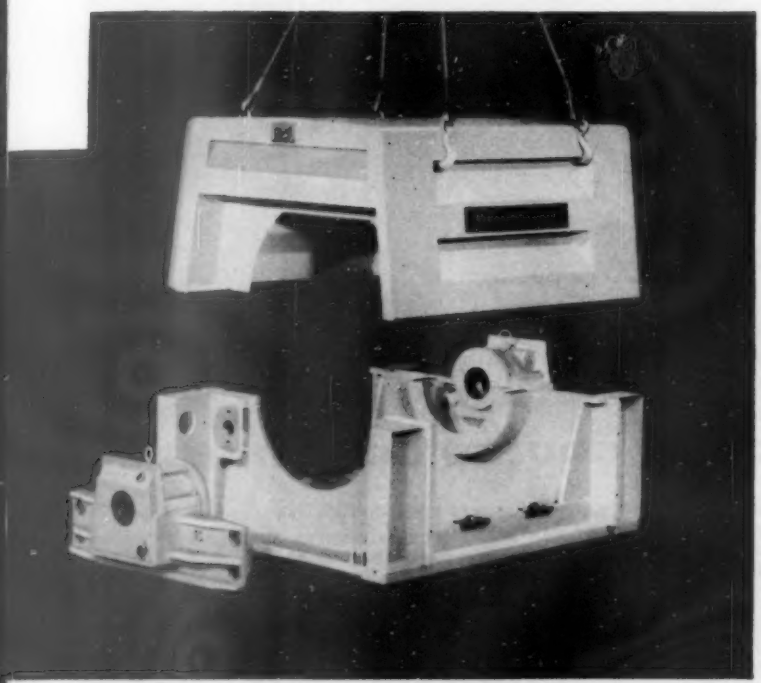
cuts inspection time and costs as much as 75%

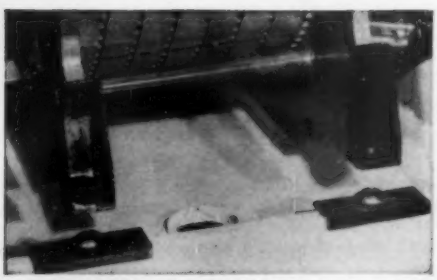
and long life for your large motor investment. Speedier work saves up to 75% of the man-hours and money usually expended in these procedures. Outages, too, are fewer and shorter.

In addition, these bonus values are yours in the F/A Motor—Thermalastic® insulation, with super-reliability proved in over 50 million kw of Westinghouse large rotating apparatus since its development 11 years ago; extra quietness, virtually eliminating the shrill screech of the typical large motor.

You'll want more information on this most modern of all large motors. Call your Westinghouse representative, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-15016





Special ball-and-socket type locator joints simplify removal and replacement of stator in annual inspections. In reassembly, perfect realignment is automatic.

COMPARE! How much time are you spending on large motor inspections?

USE THIS SIMPLE CHART TO MAKE YOUR OWN COMPARISON TESTS!

INSPECTION OPERATION	TIME—F/A MOTORS	TIME—YOUR MOTORS
Routine: Including windings, bearings and leads.	Removal of panels and shields—38 min. Replacement—56 min.	
Annual: Including complete teardown.	Disassembly—90 min. Reassembly—120 min.	

Westinghouse

"Buffalo" Air Cooled Condensers Handling Propane Gas on Refrigerated Liquid Propane Storage Spheres. Photo—Courtesy of Rust Engineering Co.

WITH NEW "BUFFALO" AIR COOLED CONDENSERS

Some time ago, "Buffalo" began field testing Air Cooled condensers and Air Cooled Liquid Coolers of completely new design. But we withheld the advertising of this unique product until we could talk in terms of a **field-proven** unit. Now, we can.

"Buffalo" Air Cooled Condensers have been installed on a wide variety of applications. Reports from actual users now prove their highly efficient and economical operation. They provide complete freedom from operating difficulties. Service requirements are reduced to an absolute minimum.

These field reports prove beyond all doubt that the new "Buffalo" units have eliminated the difficulties common to most air cooled condensers.

Only "Buffalo" Air Cooled Condensers Bring You All These Advantages:

VERTICAL DISCHARGE—is not affected by wind velocity—holds compressor on line.

EASY-TO-INSTALL—shipped as factory-assembled packages. Lifting eyebolts simplify rigging.

LOW SILHOUETTE—the No. 1000 unit is only 76" high.

OPPOSED BLADE BY-PASS DAMPER CONTROL AVAILABLE—provides close modulating control not possible with parallel-blade dampers—or with "flooded coil control". Saves expensive refrigerant.

UNIT CASINGS—heavy-gauge galvanized steel construction insures durability, long life.

AMPLE CAPACITIES—Standard sizes from 7½ to 100 tons based on 120° condensing temp. 40° suction, 100° ambient. Larger sizes for special refrigerant, liquid or gas cooling applications available as factory-assembled packages.

Applications of "Buffalo" Air Cooled Condensers include air conditioning and steam condensing . . . also jacket water cooling of diesels, package compressors, gas turbines, electronic tubes, power transformers, process liquids, heat pumps.

For the utmost in reliable performance, new "Buffalo" Air Cooled Condensers are your best choice. Call your nearby "Buffalo" engineering representative for complete facts. Or write us direct.

"Buffalo"

BUFFALO FORGE COMPANY Buffalo, N. Y.

Buffalo Pumps Division, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

For more facts Circle 420 on Reader Service Card

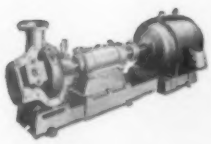
MULTIPLY ECONOMY by

5

When You Install Buffalo Pumps

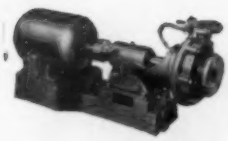
1. **Maximum parts interchangeability** reduces inventory costs.
2. **Emphasis on quality** insures extra years of economical, productive service.
3. **Peak hydraulic efficiency** insures lower operating costs.
4. **Sturdy, extra-heavy construction** means trouble-free performance.
5. **Complete Buffalo line** gives one-source buying.

Clear Water Pumps. For peak efficiency in clear water service. Highest quality construction assures long, maintenance-free life. Write for Bulletin 955.

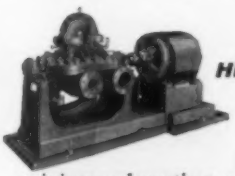


Non-Clogging Pumps. Efficiently move high consistency liquids. The diagonally split shell gives easy access for inspection. Rubber-lined models for moving abrasive or corrosive liquids. Send for Bulletin 953.

Heat Transfer Pumps. Specially designed to handle high temperature liquids. Construction includes required alloys, water-cooled bearings and packings suited to the job. High-efficiency single suction, solid shell design. Write for full information.



Chemical Liquid Pumps. These specially designed pumps stand up under the severest service, handle most types of corrosive or abrasive liquids. Choose from numerous models in exactly the trim you need. Send for Bulletin 976.



High Pressure Pumps. Designed for boiler feed and other clear water installations. These rugged pumps assure peak efficiency, minimum downtime and long life. Operate against heads to 1500 ft. Capacities to 900 gpm. For complete details request Bulletin 980.

Close-Coupled Pumps. Save space without sacrificing efficiency. Installation is simplified, no need for shaft alignment. Vertical or horizontal installation. Discharge adjustable to desired angle. Send for Bulletin 975.

Helping you select the pumps that will serve you best and most economically is your Buffalo Representative's job. Contact him today, or write us for complete facts.

BUFFALO PUMPS

Division of Buffalo Forge Company

471 Broadway Buffalo, New York

"Buffalo" PUMPS

Canada Pumps, Ltd., Kitchener, Ontario

Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

NEW! a fireproof asbestos-cement structural sheet you can staple around corners!

"K&M" KAMWALL

BEND IT ... AROUND CORNERS AND OVER OBSTRUCTIONS!

STAPLE IT ... OR NAIL IT WITHIN ¼" OF EDGE!

SAW IT ... WITH AN ORDINARY HAND SAW OR SCORE IT WITH A KNIFE!

Unique new "K&M" KAMWALL gives you all the advantages of an asbestos-cement structural sheet and then some! It conforms to irregular surfaces and foundations ... permits unusual design and architectural effects. KAMWALL is ideal for tile floor underlayment, for fireproof interior partitions, fire barriers, furniture, plus 101 other applications where fire, vermin, dampness, and rot may be a problem. Its smooth surface makes it readily adaptable to all types of finishes. Painting enhances its beauty. And KAMWALL is so workable, all fitting and cutting is easily done on the job with ordinary carpenter's tools. KAMWALL can be stapled ... or nailed close to its edge **without** predrilling. It permits light, narrow framing members. Such workability saves labor, time ... reduces on the job breakage. Write today for a sample of KAMWALL and additional information. Get all the facts—fast! Keasbey & Mattison Company, Ambler, Pa. Dept. B-3860.

K·M
BEST IN ASBESTOS

KEASBEY & MATTISON at Ambler

Photo courtesy of St. Petersburg Times

Handled with Clark ingenuity...and care!

Maybe you handle cartoned goods, or steel coils, or food in glass bottles, instead of rolls of paper. But the same important factor of *correct application engineering* is vital regardless of *what* you handle.

Take these paper rolls as an example. Industry needed a faster, safer, *damage-free* handling method. After a thorough study of all available techniques and equipment, Clark engineers developed the *ideal* paper roll clamp . . . one that provided every possible needed feature.

But Clark application engineering goes *beyond* special product design. It goes as far as specifically fitting the correct materials handling vehicle to your specific type of operation. It assures you of the right type of truck, in the correct capacity and power type, equipped with the right accessories and attachments. The end result is the ultimate in operating efficiency, at lowest possible cost.

We think we can help *you* through our application engineering. A call to your local Clark dealer (listed in the Yellow Pages) or a letter to the factory is all that's necessary to initiate action. If you care to write, address: Application Engineering, Clark Equipment Co., Battle Creek, Michigan.

CLARK® EQUIPMENT

For full details, circle 77 on reader service card

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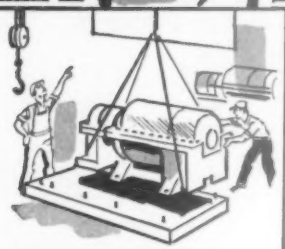
ONE MAN and SAKRETE®

CAN SOLVE CONCRETE MAINTENANCE PROBLEMS



CONCRETE MIX
for
Machine Bases, etc.

SAND MIX
for
Grouting & Patching

MORTAR MIX
for
Pointing Up Walls

BLACK TOP
for
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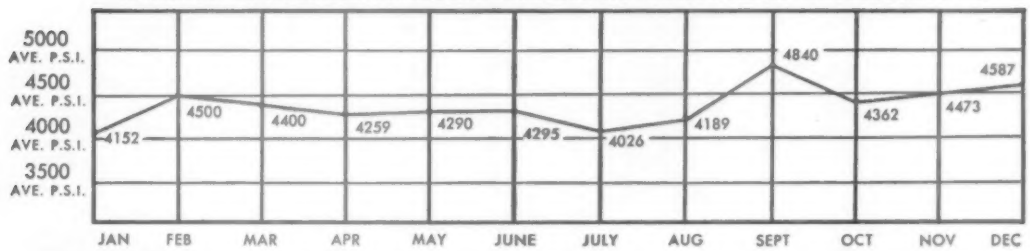
Even we were surprised when a National Survey showed that over 5,000,000 sacks of SAKRETE were used annually by industry.

It also showed that it was used so extensively because:

1. Saves 50% labor
2. No dirt or clean up
3. No waste material
4. Warehouses indefinitely
5. Available for after hour maintenance
6. Uniform quality
7. High strength
8. Centralized quality control
9. Exceeds A.S.T.M. Specification C 387
10. Fool-proof. Directions tell you how much a sack covers.

SAKRETE NATIONAL AVERAGE STRENGTH CURVE FOR CONCRETE 1959



SAKRETE NATIONAL QUALITY CONTROL

There's a Sakrete Dealer near you... Call him Today

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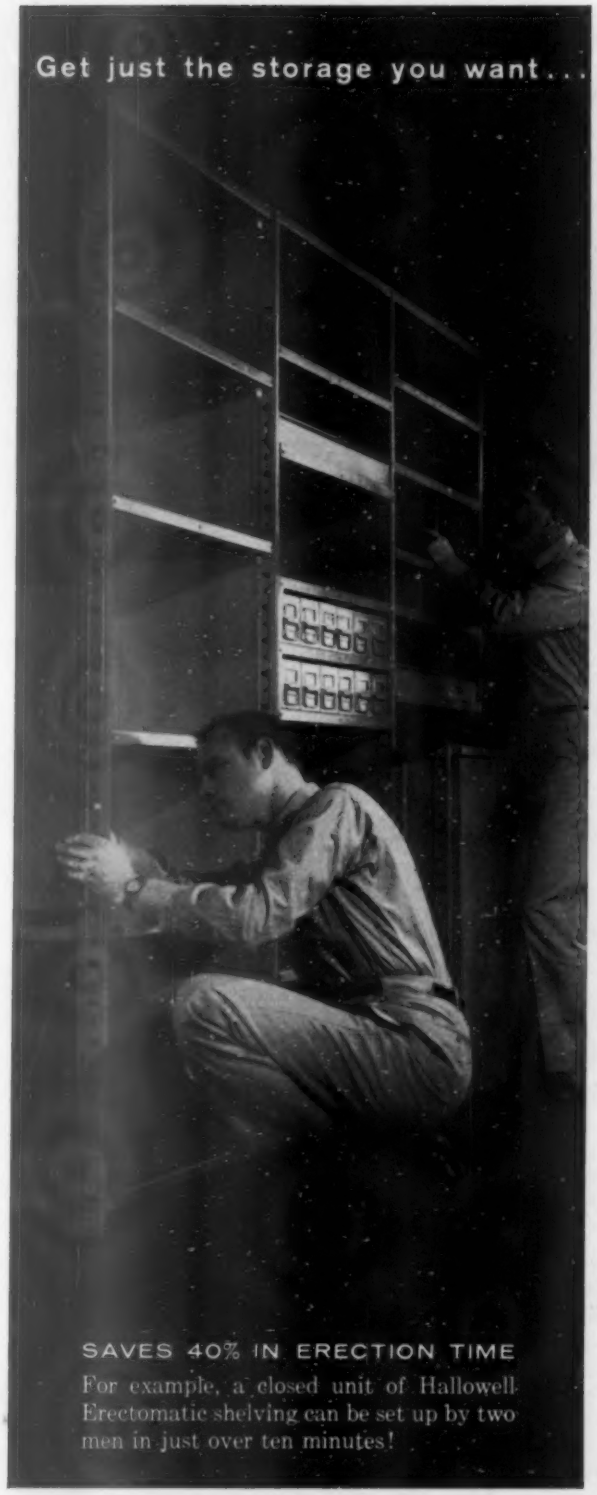
Get just the storage you want...
SAVES 40% IN ERECTION TIME
For example, a closed unit of Hallowell Erectomatic shelving can be set up by two men in just over ten minutes!

fastest and easiest with

HALLOWELL
ERECTOMATIC® SHELVING

Only ERECTOMATIC gives you these features:

Quick Shelf Installation. Position shelf support. Slide in shelf, press latches. Takes only seconds. No tools needed.

Straight-in, Straight-out Shelf Change. No tilting, unloading or disturbing other shelves. No removing bin fronts, dividers, etc.

Full Use of Shelf Area. No tees, no angles. Beaded posts let you make use of full shelf width. (And reduce cuts and snagged clothes.)

GET THE FULL STORY IN NEW FREE CATALOG

COLUMBIA-HALLOWELL Division SPS
Jenkintown 11, Pa.

Please send me the Hallowell Erectomatic Catalog

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COLUMBIA-HALLOWELL Division SPS JENKINTOWN 11, PA. • SANTA ANA, CALIFORNIA

where reliability replaces probability

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Fastener driving accuracy–

CP twenty-spindle Multi-runner drives transmission oil pan screws with speed and accuracy

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

an ASTME Show highlight

CP demonstrates latest in "One-Shot" Torque Control Screwdrivers and Nutrunners

The CP Booth at the ASTME Show in Detroit really packed them in. Production men responsible for assembly, quality control and standards learned first-hand facts about "one-shot" Torque Control tools. They watched new hand-held tools and multi-spindle units prove their consistent accuracy... saw a new Torque Analyzer prove its ability to test and calibrate Torque Control power tools. They proved for themselves, that CP Screwdrivers and Nutrunners can hold the specific torque settings so essential on today's fast-moving production lines.

The CP exhibit featured the most extensive line of standard "one-shot" straight and angle Screwdrivers and Nutrunners, Multiple Motors and Impact Wrenches ever offered to the assembly industry.

If you missed the show... don't miss the facts. To get the full story on CP "One-Shot" drivers for hand-held or multi-spindle job requirements – use the handy coupon below.

NEW CP-200 Torque Analyzer tests and calibrates torque control power tools.

NEW CP-3017 Dial Tork Nutrunner, the only instantly adjustable power tool that inspects as it drives.

NEW Micro-Tork Screwdrivers for large or small fasteners.

NEW CP-3090-ATN-300 "jolt-free" Angle Nutrunner.

GET 12 PAGES OF STRAIGHT FACTS ON "ONE-SHOT" TORQUE CONTROL TOOLS. USE THIS COUPON TO MAKE SURE OF YOUR FREE COPY.

Chicago Pneumatic Tool Co., Dept. F-60
8 East 44th Street, New York 17, N. Y.

Please send a copy of SP-3266, your 12 page color booklet on "One-Shot" Torque Control Screwdrivers, Nutrunners, Angle Nutrunners, Multi-Runner Motors and Torque Analyzers.

Name_____

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MOS

NEW SYSTEMS TECHNIQUE PROVIDES CURRENT DATA TO CONTROL YOUR MANUFACTURING CYCLE... MAKES YOUR OPERATION MORE EFFICIENT, WITH FASTER RESPONSE TO CHANGES

IBM MANAGEMENT OPERATING SYSTEM

To coordinate planning and control functions continuously throughout the manufacturing cycle IBM has developed a unique Management Operating System. This system makes use of existing IBM data processing equipment, proved in thousands of industrial installations.

WHAT IS THE IBM MANAGEMENT OPERATING SYSTEM?
MOS is a data processing technique that provides the information needed to control your manufacturing cycle. It is designed to handle automatically the decision data required to carry out related functions, from planning and operations control to evaluation. It provides accurate data on a continuing basis . . . in time for effective management decisions.

WHO CAN USE MOS?
The IBM Management Operating System is a flexible technique that can be applied to most types of industrial operations. Every manufacturing operation is unique, however, and IBM manufacturing representatives have been trained to work with you to adapt the basic concepts to your needs. This is an important aspect of IBM Balanced Data Processing—compatible equipment backed by complete services. It gives you comprehensive support in applying the system to your company's operation.

For full information about the IBM Management Operating System, contact your local IBM office.

HOW IBM MANAGEMENT OPERATING SYSTEM PROVIDES DATA TO CONTROL THE MANUFACTURING CYCLE:
FORECASTING
Sales data is reviewed to produce a finished product plan.
MATERIALS PLANNING
Materials requirements are determined.
MOS

INVENTORY MANAGEMENT
Optimum inventory levels are established and maintained. Purchase orders and manufacturing orders are created.
SCHEDULING
Based on customer requirements and available facilities, a manufacturing plan is produced.
DISPATCHING
Work priorities are established to implement the manufacturing plan. Adjustments are made to meet engineering and shop changes.
EVALUATION
Operating data is compared to control standards. Exception reports, on cost and efficiency, are furnished for timely management action.

IBM®

BALANCED DATA PROCESSING

For more facts Circle 427 on Reader Service Card

Weldments handled efficiently with Load Lifter® Electric Hoists

Load Lifter Series "700" Wire Rope Electric Hoists. ½ to 15 tons. Fast, heavy-duty hoists with two automatic brakes and safe 24-volts at the push-button control. Two-speed models for spotting fragile loads safely. Lug suspension and push, hand-geared and motor-driven trolleys available. Hi-hook model increases length of lift.

Load Lifter Series "600" Wire Rope Electric Hoists. ½ and 1 ton. Low headroom construction. Tough, light-weight hoists that speed production processes. Separate load and motor brakes act simultaneously. Single and two-speed models with 24-volt push-button stations. Lug or hook suspension; push and motor-driven trolleys available.

60 F-1

Bird Machine Company, South Walpole, Mass., engineers and manufactures a large number and variety of special machinery for the pulp and paper and the chemical process industries.

Weldments up to 20 tons are part of some of the machinery. A battery of Load Lifter Electric Hoists solves the problem of handling them efficiently and safely. Suspended from swinging jib cranes in the modern welding shop, each hoist can serve several work stations. They can also transfer units station-to-station for precise positioning and welding.

The different weights, shapes and sizes of the weldments for Bird Machine products make Load Lifter Electric Hoists the ideal choice. They are fast hoists operated by push-button. Two brakes assure quick action for accurate spotting. And, the wire rope load line solves the problem of making nominal side lifts safely.

Phone your nearby Shaw-Box Distributor for complete facts about Load Lifter Electric Hoists. Or write for Bulletin 15025-1C.

LOAD LIFTER ELECTRIC HOISTS

A product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd. • Galt, Ontario

For more facts Circle 428 on Reader Service Card

Bright, durable Gilman Aluminum Paint protects new Chattanooga bridge

Best way to cross the Tennessee River to Chattanooga, the handsome new Olgiati Bridge gleams with Gilman Aluminum Paint, made by Gilman Paint & Varnish Co., Chattanooga, Tenn.

That gleam in a Chattanooga commuter's eye these days could be (we like to think) from Gilman Aluminum Paint. Because the spectacular new Olgiati Bridge across the Tennessee River is protected stem to stern with it. Solution to one of the area's historic traffic jams, the handsome 4-lane span is a key link in the Greater Chattanooga Freeway system. The State of Tennessee purchased Gilman Aluminum, a top-notch brand made with ALCOA® Pigments, to coat all structural members.

Lasting appearance and low maintenance make aluminum paint the choice of most bridge and highway builders . . . and plant engineers. Best protection on weather-exposed metal surfaces, a good aluminum paint like Gilman's is economical, has amazing hiding power, can be touched up without objectionable color contrast. And at night, reflective aluminum paint is remarkably visible—an important safety factor.

ALCOA does not make paint, but ALCOA Pigments are used in more aluminum paints than any other brand. Special formulas have been developed by paint manufacturers like Gilman to solve individual problems. These paints actually cost less, last longer, give utmost protection against heat, cold, sun, rain, smoke and fumes.

Send the coupon today for our booklets about aluminum paints and roof coatings. They include information about a remarkable new development — *colored aluminum.*

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and "Alcoa Theatre" alternate Mondays, NBC-TV

Aluminum Company of America
1739-F Alcoa Building, Pittsburgh 19, Pa.
Please send your free booklets:

- ☐ *Aluminum Roof Coatings Make Time Stand Still*
- ☐ *Painting With Aluminum*

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ALCOA ALUMINUM

PIGMENTS, PASTES AND POWDERS

For more facts Circle 429 on Reader Service Card

NEW FROM REPUBLIC

COMPRESSION SHELF CLIP

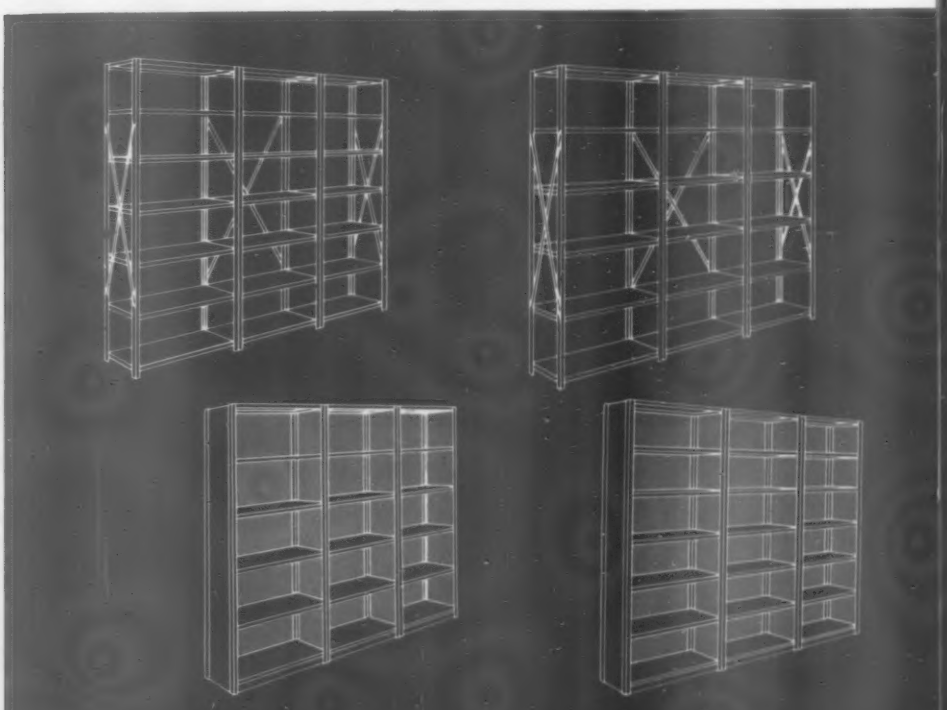
New, Republic Compression Shelf Clip is designed to ease and speed shelving erection.

No tools needed. Clip slips firmly into upright slots. Simply slip clips onto upright—no studs or bolts needed. And Clip Shelving supports heavy loads safely.

One man can erect any given assembly of Republic Clip Shelving quicker and easier than ever before. Simple shelf rearrangement and long life make Republic Clip Shelving a profitable investment.

Shelves, uprights, and accessories are Bonderized. This extra Republic feature provides a superior base for the baked-on enamel finish and protects against rust and corrosion. Clips are furnished in clear bright cadium for years of rust free service.

To learn about the advantages and economies of this new product, call your Republic representative. Or write for attractive, illustrated catalog.



REPUBLIC CLIP SHELVING Rack Type Units provide storage space for packaged goods, cartoned goods, bulky materials, and other stock not requiring the enclosure of backs and ends. Sway braces add to the rigidity of rack type units. Open and closed, the assemblies shown here are typical of the thousands of combinations possible with Republic Clip Shelving. Write for catalog.

STAINLESS STEEL reduces food handling and serving costs seven miles at sea! This kitchen is part of Freeport Sulphur Company's Grand Isle Sulphur Mine operation in the Gulf of Mexico, seven miles off the coast of Grand Isle, Jefferson Parish, Louisiana. Stainless steel was selected for all utensils used in cooking, serving, and storing of food, due to its sanitary properties and ease of maintenance and cleanability. Stainless steel is tough, strong, sanitary—provides lifetime beauty, plus outstanding resistance to heat, denting, scratching. Easy to clean. Send coupon for more information.

REPUBLIC . . . CAN DO IT FOR YOU! Contract manufacturing, with complete sheet steel fabrication facilities, is a full time operation at Republic's Berger Division. Well rounded stock of tools and dies, and a complete machine shop. Modern equipment for shearing, punching, forming, finishing, and painting. Mechanized crating department with conveyor line carton-packaging facilities. And Republic engineers will work with you in developing your product and solving manufacturing, assembly, and delivery problems. Call, or write today.

REPUBLIC STEEL LOCKERS improve employee relations with clean, attractive, dress-wash-and-change facilities. Big, roomy interiors are planned for convenience and good ventilation. Strong and sturdy—made of steel. Complete protection for tools and personals. Bonderized for long service life. And Republic's Berger Division will help you with your locker planning and assume full responsibility for proper installation. Call your Republic-Berger representative, or write.

REPUBLIC STEEL

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

For more facts circle these numbers:

430 Shelf Clip, 431 Stainless Steel,

432 Steel Lockers, 433 Contract Facilities

REPUBLIC STEEL CORPORATION
DEPT. FA-9423-A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

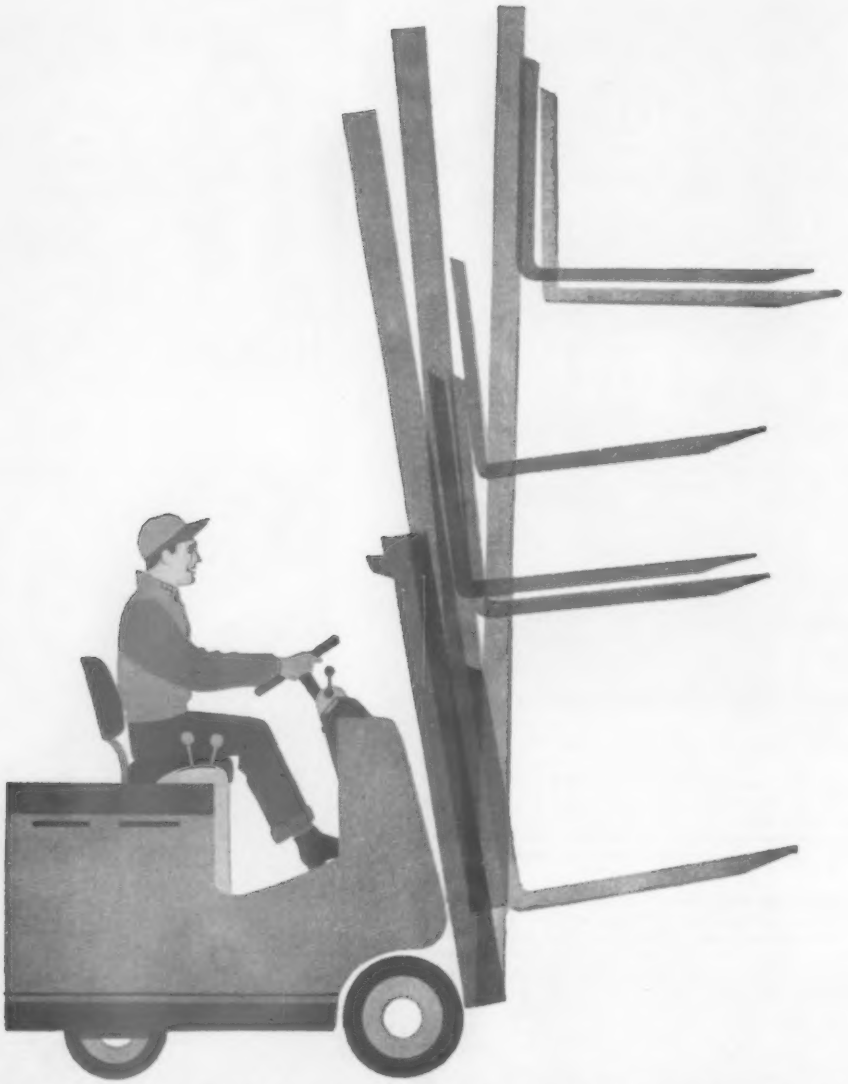
- ☐ Republic Compression Shelf Clip—Catalog
- ☐ Republic ENDURO® Stainless Steel
- ☐ Republic Steel Lockers
- ☐ Republic Contract Facilities ☐ Have an engineer call

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____



BUY THE LOWEST-COST BATTERY YOU CAN FIND

New 800 amp-hr Model TGS Exide-Ironclad. Same outside dimensions as former 720 amp-hr battery. Other new 22⅝-in. high Exide-Ironclad Batteries in capacities from 400 to 1280 amp-hr.

In the whole world, only the new Exide-Ironclad TG Super gives you so much battery power for so little. Packs 11% more power with no increase in size. That means your present trucks can do more work every shift. And this more powerful battery actually costs you less per amp-hr. Same long Exide-Ironclad life potential for low annual cost. Search all you want. You'll discover, as most others have, that the Exide-Ironclad is truly the lowest-cost battery you can find. Write for our new bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 20, Pa.

New Exide battery for small industrial trucks and personnel carriers. Model 3-KCS-9. Features new-design tubular positive plate. Up to 30% more capacity than automobile batteries. Up to four times their average life. Fits same compartment. Write for new bulletin.

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Seal the joint and you seal the building!

One shot with sealant based on THIOKOL polysulfide rubber weatherproofs for years on end!

Metal to Glass

Long-term insurance against joint leakage, sealant based on THIOKOL polysulfide polymer adheres with weld-like strength to all types of structural materials in any combination. Its elastomeric properties allow for the expansion variables in materials, and cushion against shock and vibration of wind and traffic.

Easily applied by caulking gun, polysulfide sealant provides custom-sealing on the job. No vulcanizing, no application of compression is needed to form a watertight seal. Too, tolerances in structural materials and their normal variation from engineering specifications can be compensated for immediately.

Stone to Stone

Metal to Masonry

For more than a decade, sealants based on THIOKOL liquid polymers have answered industry's toughest sealing problems. For full information, write to THIOKOL at address below.

Thiokol®

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In Canada: Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ontario

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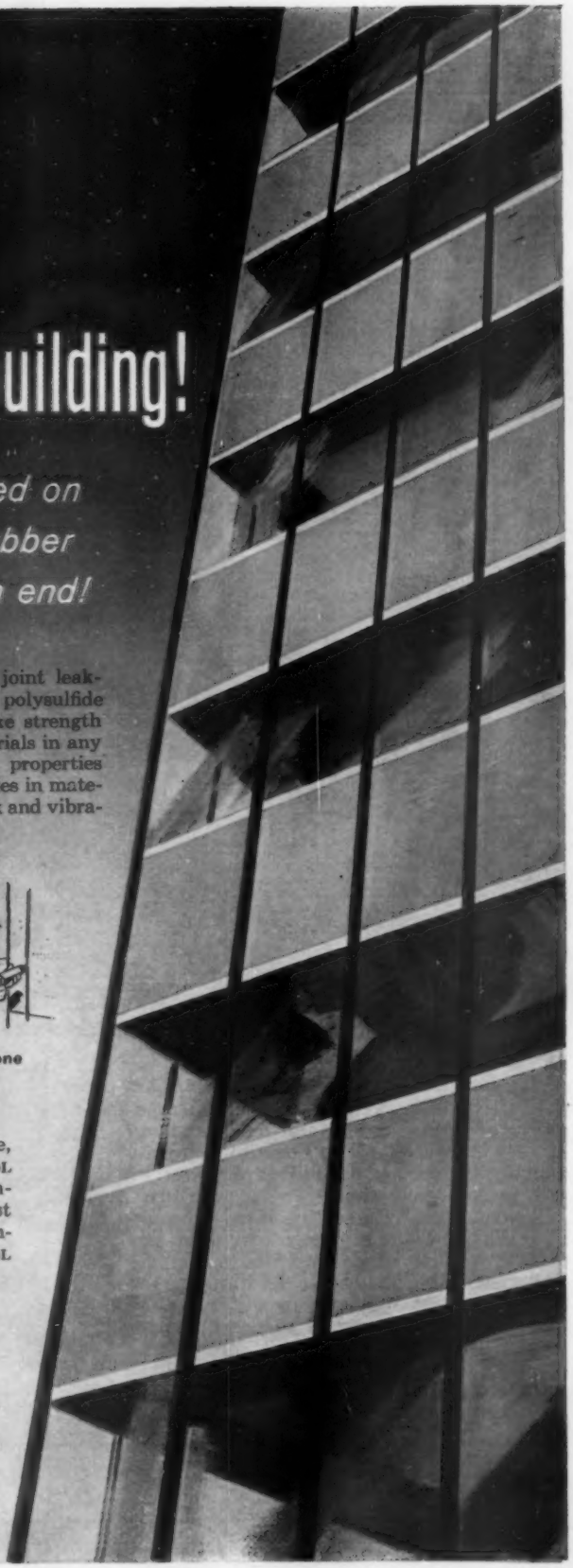


Gibson Fixtures Give You More Than Good Lighting... Much More!

Architect: Korslund, LeNormand & Quann, Inc. / Electrical Engineer: Edwin L. Steinbrenner / Electrical Contractor: Hixon Electric Co. / General Contractor: Vappi & Co., Inc.

"Gibson lighting fixtures offer distinct advantages in installation and maintenance," reports an official of The Foxboro Company which uses Gibson fixtures throughout its new assembly building.

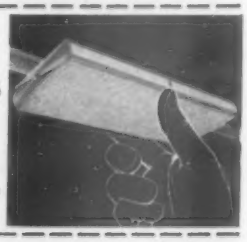
"Our Gibson fixtures," he says, "were installed faster and at lower cost than any others we have used. The fact that these fixtures can be plugged in and un-plugged like an electric appliance means that they can be quickly re-spaced to accommodate changes in plant layout and can be dismounted instantly for servicing without distracting production workers."

Write for descriptive literature today.

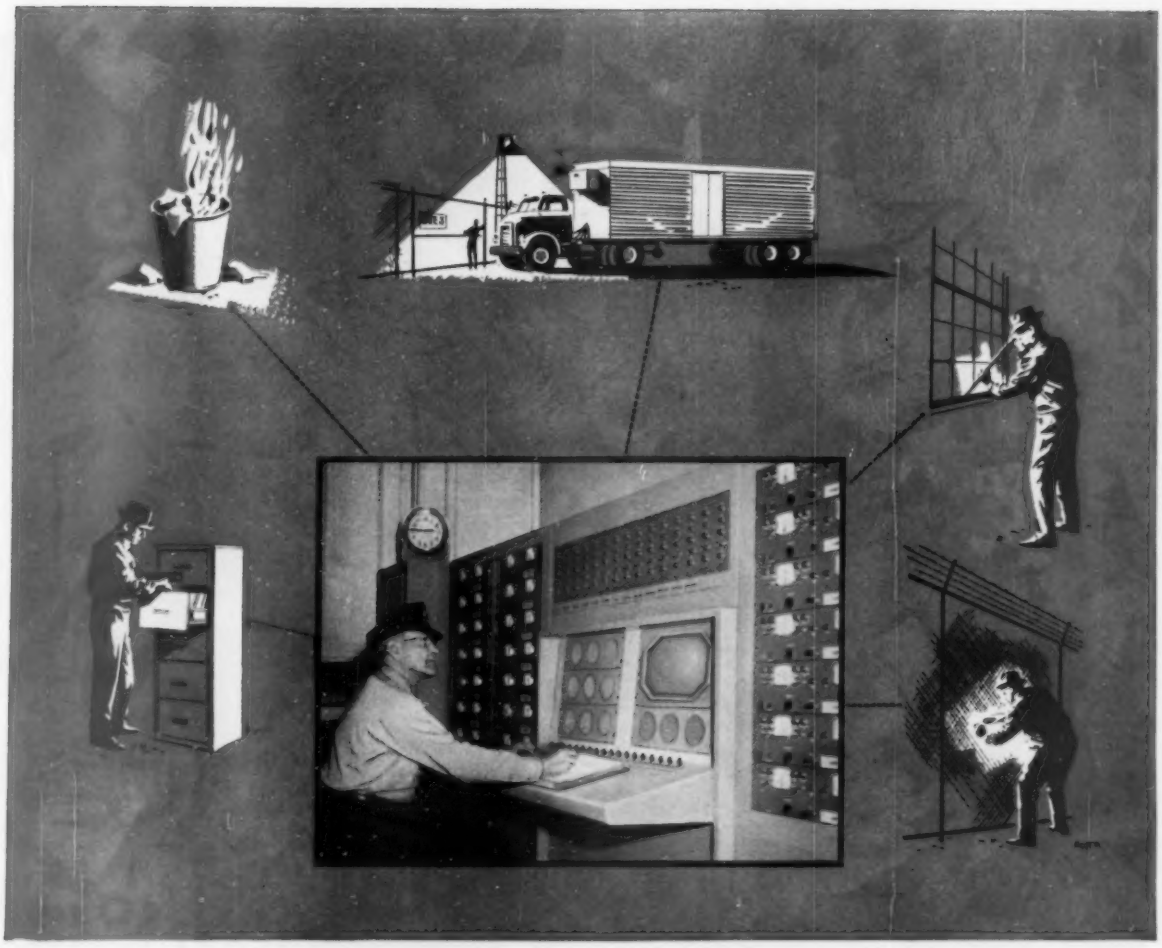
GIBSON

Gibson LIGHTING

Makers of
THE FIXTURES THAT JUST "PLUG-IN"
PAT. PENDING
COMMERCIAL, TROFFERS, INDUSTRIAL



GIBSON MANUFACTURING COMPANY
1919 Piedmont Circle, N. E., Atlanta 9, Georgia



How Honeywell electronics improves plant protection and lowers costs!

This completely new concept in protective systems enables one guard to do the work of many—more effectively. From a central control panel, he can instantly check the security of any building or area—even remote gates 20 miles or more away. Through electronic signals, the system employs all three means of detection—*physical* break in, *audible* noise created by the intruder and *motion* by anyone concealed within the plant. It detects any form of illegal entry, loitering, vandalism and sabotage, as well as fire. And it can provide complete surveillance of temperature, refrigeration, lights, boilers and flows.

No other method can begin to compare in savings and efficiency. By eliminating guard posts and increasing plant protection, this security system can pay for itself within a year, and go right on adding to your profits year after year. For every 24-hour guard post that you eliminate, you save $25,000. In larger plants, where more costs are eliminated, savings increase proportionately. *For a free survey* of your plant, call your nearest Honeywell office. Or write Minneapolis-Honeywell, Dept. FM-6-118, Minneapolis 8, Minn. In Canada, write Honeywell Controls Limited, Toronto 17, Ontario.

Honeywell

75 YEAR PIONEERING THE FUTURE

H HONEYWELL *First in Control* SINCE 1885

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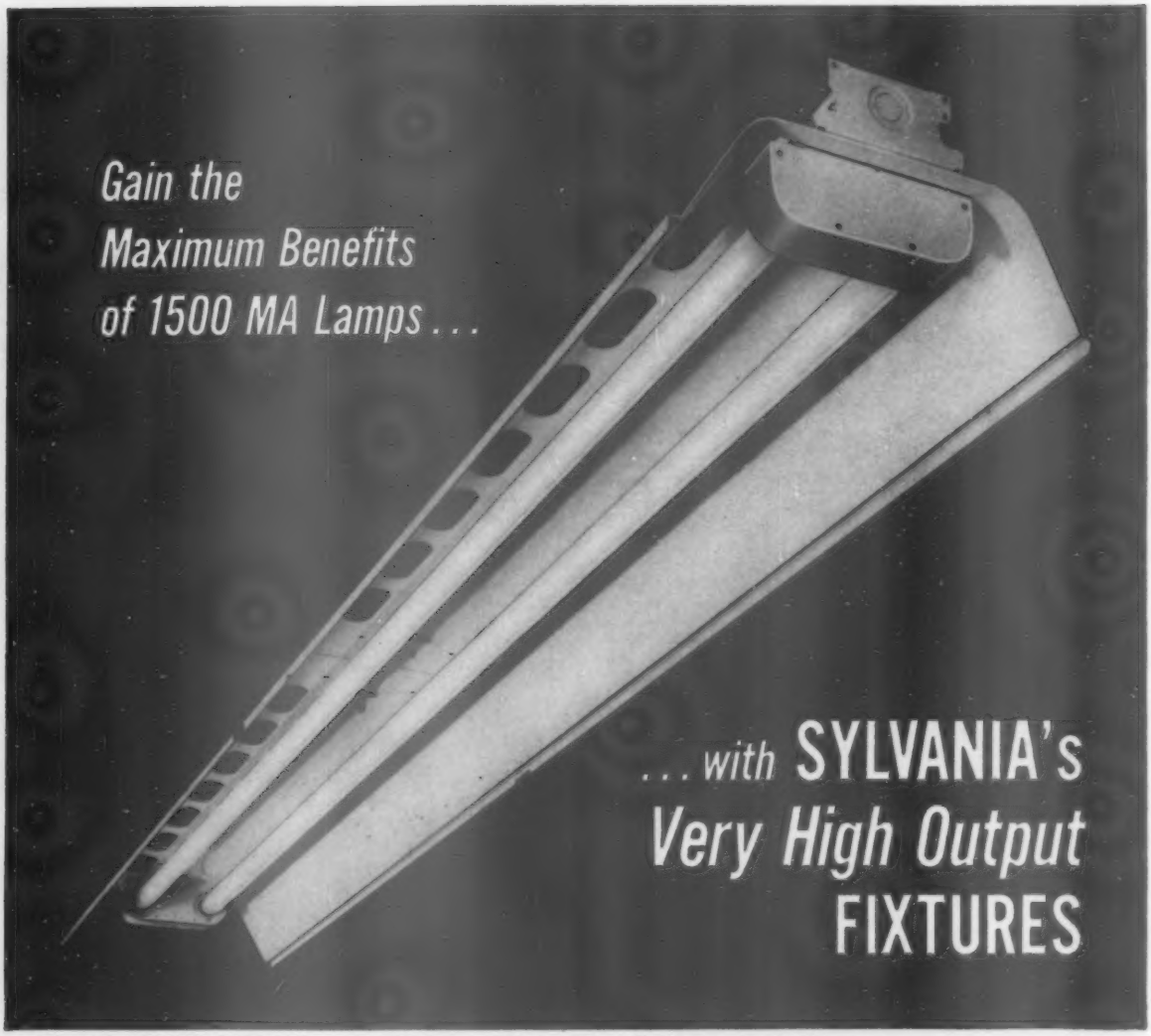

Sylvania's NTWWS-2V28-RLM. One of Sylvania's complete line of Very High Output fixtures.

This fixture, with its wider 16" reflector, received immediate RLM approval, after testing, when the new RLM specifications for 1500 MA fixtures were announced.

Sylvania's broad line of Very High Output fixtures, using the powerful 1500 MA lamps, provides a *practical* and *economical* solution to a vast range of lighting problems.

Because they were designed to take full advantage of the tremendous light output of the 1500 MA lamp . . . and still maintain the features needed to control bothersome glare and brightness contrasts . . . Sylvania's Very High Output fixtures assure lighting *quality* to go along with the increased *quantity*.

And they cut down on initial costs, too, by saving 10¢ to 50¢ per square foot in the average installation.

Look into the advantages of using 1500 MA fixtures for *your* lighting. And be sure of getting *quantity* and *quality* by insisting on Sylvania's Very High Output fixtures.

Complete technical and photometric information will gladly be sent to you upon request.

SYLVANIA LIGHTING PRODUCTS
A Division of SYLVANIA ELECTRIC PRODUCTS INC.
One 48th Street, Wheeling, West Virginia

GO MODERN WITH LIGHTING BY **SYLVANIA**

Subsidiary of GENERAL TELEPHONE & ELECTRONICS

FLUORESCENT LIGHTING FIXTURES AND SYSTEMS • BEST FIXTURE VALUE IN EVERY PRICE RANGE

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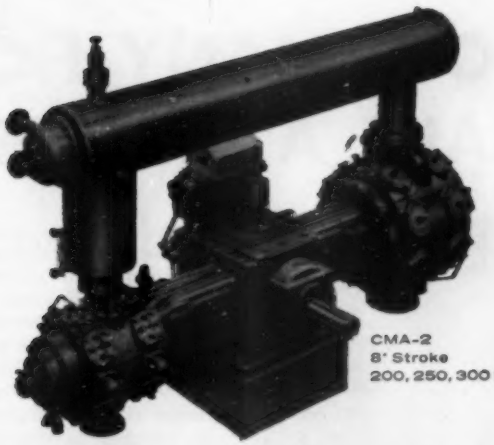
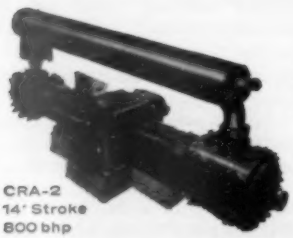
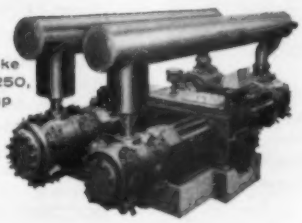


CMA-2
8" Stroke
200, 250, 300 bhp

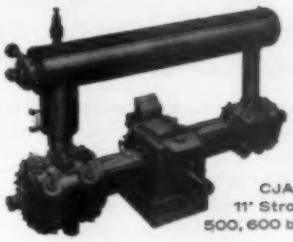
Whatever your requirements for industrial air,



CRA-2
14" Stroke
800 bhp

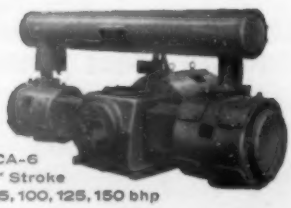


CRA-4
14" Stroke
1000, 1250,
1500 bhp

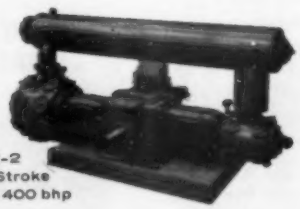


CJA-2
11" Stroke
500, 600 bhp

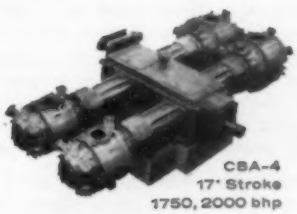
there's a Clark Balanced/Opposed Compressor



ICA-6
6" Stroke
75, 100, 125, 150 bhp



CMB-2
8½" Stroke
350, 400 bhp



CBA-4
17" Stroke
1750, 2000 bhp

to do it better & more economically in less space.

Six Stroke Sizes...23 Models. The Balanced/Opposed design is only one of many innovations that have made Clark air compressors the most dependable in industry today. Rugged and compact, they are specifically designed to handle your "100 lb." air requirements most economically. ■ Born of exhaustive research and proved by millions of hours of service, Clark Balanced/Opposed Industrial Air Compressors are engineered for maximum performance and reliability. They come equipped with "Simplaire" Valves—the simplest air compressor valves in the industry . . . easy to put together, easy to take apart, and *easy on your maintenance budget*. From a comprehensive line of 23 models, you can pick the compressor that's *right* for your needs. Sizes from 75 to 2000 horsepower; capacities range upward from 375 cfm. ■ For all the reasons why you'll be dollars ahead with Clark compressors, contact your Clark representative today, or write for Bulletin 185, **Clark Bros. Co., Olean, N.Y.**

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RAPISTAN Ideas HANDLING

HOW MANY HOURS MAKE A WAREHOUSE?

Unlike theoretical scientists contemplating the fourth dimension, materials handling engineers have a very practical concern with the element of time. In warehousing situations, for example, "how long" is a vital consideration, along with "where", "how much", and "when".

How long must goods remain at rest before they constitute a warehousing problem? An hour, a day, a week, a month? There is no universal answer. In modern and efficient handling systems, where warehousing operations are closely coordinated with other phases of the flow system, a true warehousing problem can result from materials being stopped or stored a few minutes as well as a matter of weeks. And, since such short-term stop-overs usually involve frequent rehandling, rapid turn-over can be a more costly problem than long-term storage would be.

It's paradoxes like this that send materials handling managers to their nearest Rapistan engineer for practical ideas on solving their in-plant warehousing problems. Rapistan has evolved some interesting new concepts of long and short-term accumulation. And, Rapistan makes what it takes to put these storage problems "on wheels", where they're handled with the same efficiency you demand in the planned movement of goods over your flow system. The problems may be solved by a special-design Flow Rack for live storage, or something as familiar as a standardized type of wheel or roller conveyor, or a creative application of overhead trolley conveyor, or something as new as our APC "Pressure-sensing" conveyor.

Why not call in your Rapistan handling engineer and let him go "warehouse hunting" with you in your plant. He's trained to spot these "hidden" warehousing problems wherever they may occur in a plant's operations. And he's had worlds of experience in turning these problems into profits for all kinds of manufacturers as well as wholesalers and retailers. We'll show you some examples, in illustrated case studies. Just **call on your Rapistan engineer.**

RAPISTAN FLOW RACK SOLVES a localized warehousing problem in this plant. An optimum supply of all parts needed in this assembly area are held in live storage, easily accessible to the worker. As parts are removed from the Flow Rack, others flow forward to take their place.

DOZENS OF HANDLING PROBLEMS SOLVED

by imaginative use of power and gravity conveyor and improved methods of storage, are illustrated in this newly-revised Handbook of Materials Handling Ideas.

R-K POWER-AND-FREE CONVEYOR KEEPS WAREHOUSED GOODS MOVING

Warehousing problems frequently occur following manufacturing operations, such as this sewing department in a large women's wear plant. Not here, however. Rapistan-Keystone overhead conveyor takes the finished goods directly from sewers to packers, via a power-and-free trolley system. No problem of finished goods accumulation, no floor traffic, no manual movement. Costs go down, as combined storage and transportation goes up on R-K conveyor.

Rapistan®

CONVEYING EQUIPMENT

The RAPIDS-STANDARD CO., Inc.
692 Rapistan Building, Grand Rapids 2, Michigan

FACTORY PRESS TIME REPORT • JUNE 1960

Looking Ahead in Business

The business outlook remains healthy, despite the diplomatic explosion at the Summit. Official records of business activity in recent weeks indicate precisely how healthy the remainder of 1960 is likely to be for the nation's manufacturers.

Gross National Product (the over-all measure of business activity), for example, should hit an annual rate of $505-billion during the current quarter. At that level, the GNP will be running well ahead of the rate for the same three-month period that ended in March of this year.

•

Behind the mushrooming GNP are a series of other significant developments that definitely add up as plus factors on the business outlook in the months still ahead in 1960:

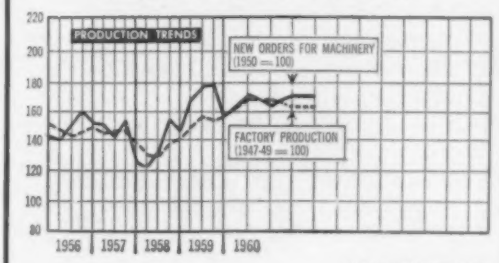
• **Employment jumped substantially during April, while unemployment dropped.** According to latest figures, the number of workers employed in agricultural and non-agricultural jobs increased by 1.9 million. Unemployment was down by more than half a million from the preceding month.

• **Retail sales showed a healthy improvement during April, reflecting stepped-up buying by consumers emerging from the restrictions of a cold winter.** Retail sales for the month were up 3% over March figures, and 5% higher than April, 1959. Experts feel this boost in sales also played an important part in increasing employment for the month.

• **Personal income climbed to a new record high during April, thanks to rising employment and higher wage scales prevailing in many industries.** Total personal income passed the $397-billion mark, on a seasonally adjusted annual basis. More important, the $3-billion increase during April is the biggest month-to-month gain registered so far this year.

• **Industrial output stopped declining during the month of April.** The announcement that production (as measured by the Federal Reserve Board index) again hit the 109 mark set in March completed the brightening picture. A prediction that output should continue upward in the weeks ahead adds intensity to the business sunshine.

FACTORY FIGURES OF THE MONTH



Indicator	APR.ᵖ 1960	MAR.ʳ 1960	APR. 1959
New Orders for Machinery (exc. elec.)[1]	173.0	173.0	187.0
Contracts for Industrial Construction[2]	139.0	132.0	127.0
Factory Production[3]	164.0	164.0	161.0
Consumers' Prices (cost of living)[4]	126.2	125.7	123.9
Industrial Prices (materials, supplies)[4]	128.7	128.6	128.3
Manufacturing Employment (millions)[4]	16.4	16.5	16.0
Total Employment (millions)[5]	66.2	64.3	65.0
Unemployment (millions)[5]	3.7	4.2	3.6

ᵖ = preliminary ʳ = revised

Sources: 1. McGraw-Hill Department of Economics (1950 = 100); 2. Engineering News-Record (1950 = 100); 3. U. S. Federal Reserve Board (1947-49 = 100); 4. U. S. Department of Labor, Bureau of Labor Statistics (1947-49 = 100); 5. U. S. Department of Labor, Bureau of Labor Statistics.

• **Record-level capital spending was planned by businessmen for 1960.** These plans, revealed in the recent McGraw-Hill survey, still have not shown up as orders for new equipment. But, on the basis of the healthy state of business in recent weeks, you can be certain that businessmen will go on to make outlays planned for this year. As they do, industrial production and business generally will show gains.

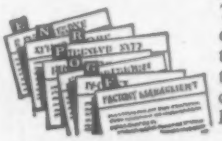
• **Inventory building is still figured to boost business.** But the pace won't be as rapid as in the first quarter of 1960, when it accounted for much of the gain in GNP. Improving sales in most industries will nonetheless call for higher stocks.

•

Summing up: Rising plant and equipment expenditures, plus higher consumer spending on goods, services, and housing will keep business growing through 1960. And at $510-billion for the year, GNP will be an impressive 6% higher than in 1959.

FACTORY PROBLEM-SOLVING GUIDE • JUNE 1960

Ideas to Cut 'n' Keep



THIS FILING SYSTEM is designed to give quick access to past FACTORY articles that can help you solve your current operating problems. Here's how it works:

1. All major articles (set here in bold type) and many short items are classified according to a functional code. Codes cover basic operating responsibilities.

2. Certain articles are also coded (see numbers in parentheses) to show secondary or closely related topics.

3. To use, cut up the items below. Paste them on 3x5-in. cards, file by code number. To cross-index, copy information on a second card, file by secondary code.

For ways to use your Problem-Solving Guide and an explanation of this Decimal Filing System, write Reader Service, FACTORY, 330 W. 42nd St., New York 36.

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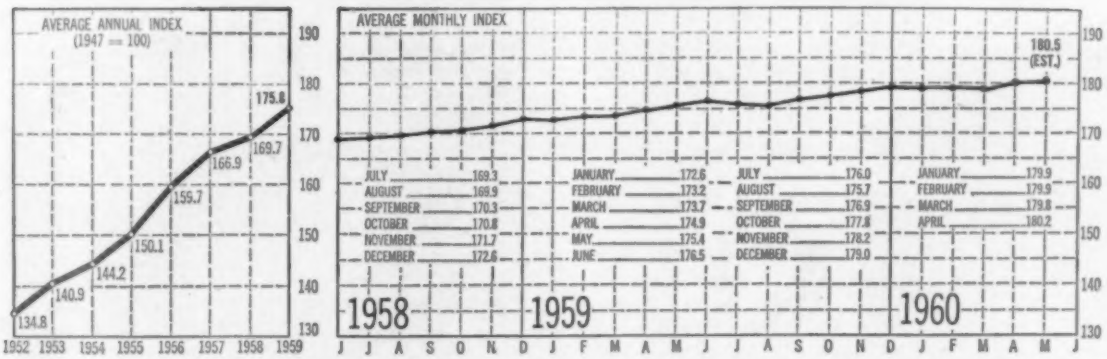
FACTORY PRESS TIME REPORT • JUNE 1960

Cost Index of Plant Maintenance



Index Starts Up Again

Higher labor costs drive chart up after two months of unprecedented decline.

After two months in the Eden of price decline, FACTORY's Cost Index of Plant Maintenance nudged up 0.4 of a point in April. Higher labor costs accounted for the jump, which overshadowed a slight drop in materials costs for the same period.

The biggest rise in labor costs came in the building and facilities index where wage costs were up 1.5 points. The wages for every type of labor reported in this area—carpenters, electricians, and painters—came higher in April than in March. Carpenters' wages are expected to continue climbing in May and June because of extended contracts the group has with employers.

In the equipment index, the cost of all manufacturing labor fell 0.8 of a point. At the same time, the cost of machine tool labor rose 1.3 points. Result: a rise of 0.3 of a point for the equipment labor component. Prediction: Labor costs will continue to rise slowly this year while materials costs will remain more stable than they have been during the last few years. Also, the cost of *skilled* labor is expected to rise more rapidly than the cost of unskilled labor—which is the case in FACTORY's Cost Index this month.

Price *declines* outnumbered price *rises* in the materials component of the building and facilities index. This trend drove materials costs down by 0.3 of a point. Overall, price rises and declines in the materials component of the equipment index neutralized each other. This meant that costs were unchanged throughout this area between March and April.

	AVERAGE 1959	APR. (Preliminary)	MAR. (Revised)
Building and Facilities Index	**166.5**	**170.6**	**169.8**
Materials	142.3	141.2	141.5
Brick	152.5	154.3	154.3
Elec. fixtures	129.0	132.4	132.4
Elec. switches, boards, fuses	185.6	184.3	184.3
Elec. wire, copper	138.9	148.6	148.6
Glass	152.0	152.0	152.0
Gutters, spouts, ducts	178.0	180.2	180.2
Gypsum products	140.8	140.8	140.8
Heating equipment	127.7	126.2	126.0
Lumber	134.5	132.8	133.5
Millwork	155.7	156.8	157.8
Paint	130.1	130.1	130.1
Pipe, cast iron	170.4	170.4	170.4
Pipe, steel	190.9	192.6	192.6
Pipe & tubing, copper	154.1	161.0	161.0
Roofing	123.7	113.3	114.3
Sanitary fixtures	155.6	161.4	164.1
Sash, metal frame trim	140.9	137.7	139.7
Solder	124.1	120.5	121.3
Steel, structural	236.3	236.3	236.3
Tanks, steel	138.0	140.2	140.7
Valves & fittings	166.7	172.5	172.5
Wire mesh	162.6	162.9	162.9
Labor	182.6	190.2	188.7
Carpenters	168.9	174.9	173.5
Electricians	191.1	199.6	198.5
Painters	187.9	196.0	194.2
Equipment Index	**179.5**	**184.3**	**184.1**
Materials	176.1	177.9	177.9
Abrasives	161.0	157.9	157.9
Alloys, non-ferrous	125.4	121.9	124.9
Bars & plate, steel	227.1	227.2	227.2
Bearings	164.1	164.6	164.6
Belting	157.3	159.3	159.5
Bolts, nuts & screws	225.6	223.8	223.8
Chain	184.0	184.0	184.0
Controls (electrical)	185.6	184.3	184.3
Gear-reduction units	181.7	181.7	181.7
Hand tools, mechanics	198.2	203.6	202.8
Lubricants	124.1	125.7	125.7
Motors	147.3	148.2	148.2
Non-ferrous metals	129.0	136.6	136.6
Precision tools	156.6	158.2	158.2
Pumps	194.8	196.1	196.1
Tools, cutting	172.4	183.0	183.0
Valves & fittings	166.7	172.5	172.5
Labor	181.8	188.6	188.3
All mfg. labor	179.9	184.4	185.2
Machine tool labor	184.2	192.7	191.4
FACTORY'S COST INDEX	**175.8**	**180.2**	**179.8**

FACTORY PRESS TIME REPORT • JUNE 1960

Looking Ahead in Labor

Labor organizers are on the go with task-force strategy. In the five years of AFL-CIO merger, union leaders have made repeated claims of new membership drives. None have come off on schedule. Union jurisdiction rivalries and a reluctance to test resistance sparked by labor racketeering revelations have helped to keep organizers out of non-union territory.

Four of the biggest AFL-CIO industrial unions have mapped out Philadelphia for a combined drive in electrical, metalworking, and auto plants. Walter Reuther's Industrial Union Department (IUD) is behind the move. The four unions involved are the United Auto Workers, the International Union of Electrical Workers, the Machinists, and the United Steelworkers.

IUD leaders reason that the Landrum-Griffin reform law has removed corruption as an emotional issue, so the time is ripe. They have begun putting pressure on unions to divide their claimed territories. The first move was a survey to locate 25 non-union plants in Philadelphia. This turned up—to their surprise—94 unorganized plants in the jurisdiction of the four industrial unions. Only seven are jurisdictional problems. These are being put aside temporarily. The other 87 are being dealt with.

Strategy of the IUD drive is simple:

- **The four unions will work out of the common headquarters set up by the IUD.** In some cases they'll share the same organizers.
- **Help will be drawn from the staff of more than 100 in the AFL-CIO organizing department.**
- **The plants to be approached are considered "small"—ranging anywhere from a dozen employees to several hundred.**

Starting the organizing drive doesn't guarantee its success. There are pitfalls:

- **Small plants are traditionally harder to organize.**
- **It costs money to sign up new members.** When unions assess the costs against the returns it sometimes doesn't seem worthwhile, so they quit. This time, the IUD—with its 67 affiliates and a membership of 6.7 million—will be behind the drive. It hopes, by constant pressure, to dispel any reluctance to continue the effort.

If the organizing works in Philadelphia, the campaign will be repeated in other major cities. And if the plant organizing goes ahead on schedule, the industrial unions expect it to spark new moves to sign up white-collar workers and technical employees.

•

Clues to future union bargaining demands are showing up in mid-1960 settlements. Wage gains so far this year are as anticipated—about 8 cents an hour. The surprises are coming in fringe settlements, not in higher costs, but in new types of fringes. An example: The contract settlements throughout the big Bell Telephone System contain a "Major Medical" plan—for the first time. It covers retired as well as present employees and their dependents.

Bargaining for pensioned employees is a new union tactic. While they no longer pay dues, they are retained in the membership ranks and become important union allies when labor seeks legislative and election support. In the steel industry contract settlement last January, the United Steelworkers won a lump-sum payment of $1500 for retiring union members. Now Arthur J. Goldberg—top steel labor negotiator—says that labor will begin demanding a "Forand-type" contract clause for company payments covering medical expenses of pensioners. Even if Congress passes a medical aid bill for those over 65, labor can be expected to try and improve on the payments through bargaining.

•

New Taft-Hartley rules in the 1959 Landrum-Griffin reform law are beginning to shake down in practice. The biggest shift in labor-management balance comes from the new curbs on union picketing. National Labor Relations Board member John H. Fanning notes that picketing "used to be nothing more than free speech . . . is now a powerful weapon."

In its first Landrum-Griffin picketing case, the NLRB ordered a teamster local to cease picketing a Dallas building materials firm. The local had picketed the firm, Macatee, Inc., after losing a representation election. Claimed its purpose was to require the company to re-hire striking employees, not to seek representation. The NLRB held the picketing violated the new rule that forbids organizational picketing for 12 months after a Board-conducted election.

SEE LABOR RELATIONS NEWS, PAGE 206

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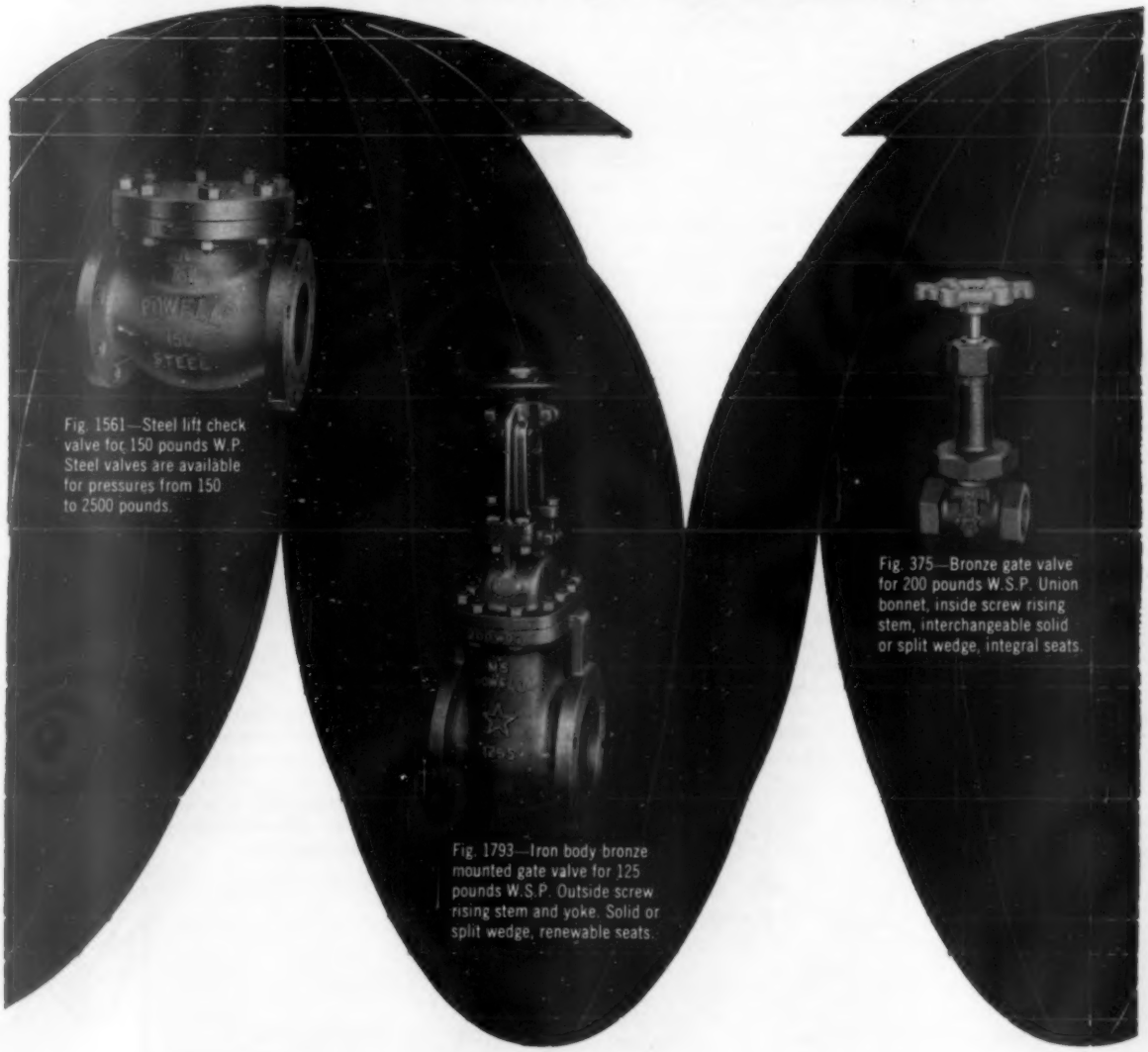

Fig. 1561—Steel lift check valve for 150 pounds W.P. Steel valves are available for pressures from 150 to 2500 pounds.

Fig. 1793—Iron body bronze mounted gate valve for 125 pounds W.S.P. Outside screw rising stem and yoke. Solid or split wedge, renewable seats.

Fig. 375—Bronze gate valve for 200 pounds W.S.P. Union bonnet, inside screw rising stem, interchangeable solid or split wedge, integral seats.

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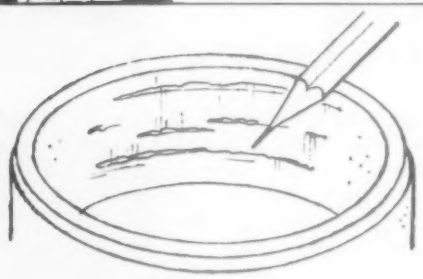
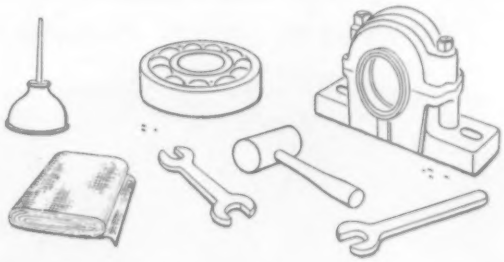
DISTRIBUTOR DAN the SKF bearing man, tells

WHAT DIRT DOES TO BEARINGS

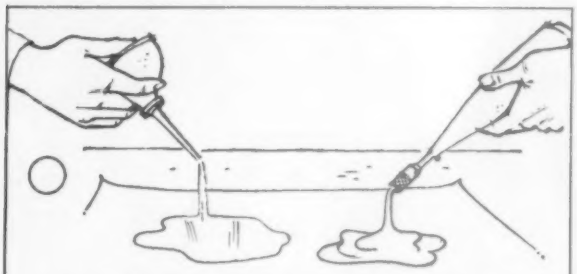
—and how you can help keep it out



LOOK FOR POLISHED, CLEARLY-MARKED BALL OR ROLLER PATHS. They're sure signs that dirt is getting into your bearings, causing lapping of the parts and ultimate failures. To eliminate this problem, follow the steps shown here.

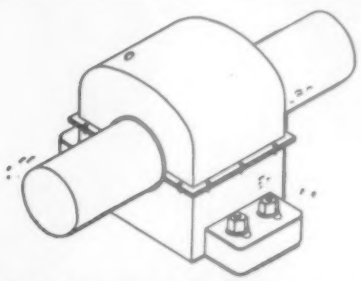


START WITH GOOD "HOUSEKEEPING." Work with clean tools in a clean area. Before you replace a bearing, clean the housing—both inside and out. Always handle a used bearing as carefully as you would handle a new one.



LOOK OVER YOUR LUBRICANTS AND LUBRICATING EQUIPMENT. Dirty oil and grease carry foreign matter with them, right into the bearing. So check them for cleanliness before you use them —and your grease guns and oil cans, too.

IS THE SEAL BENT OR WORN? If it is, dirt and dust and other foreign matter can get into the bearing. If moisture or water is present, you'll need seals made of special moisture-resistant materials.



WHERE DIRT IS A CONTINUAL PROBLEM, try shrouding the bearing housing in a metal box like the one shown here. It's inexpensive, easy to build and helps deflect dust and dirt away from the bearing.

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FACTORY

The Political Frontier

This year, as often before in history, men engaged in the management of plant operations are being crowded toward a new frontier. It's the political frontier. It's the most recent of a long series of changes in the scope of the plant management task. Changes that have forced the growth of men who simply got out production to managers who plan and specify and control and maintain. Changes that require managers to assume responsibility for employees as social beings as well as instruments of labor. Changes that integrate all manner of functions. Most recently, the changes have pressed management's chore beyond the plant walls into community responsibilities. Today, the frontier is the challenge for plant men to enter the political arena.

Responding to this challenge, on page 89 of this issue FACTORY publishes an article of deep significance: "Should You—and Plant Management—Play the Game of Politics?" In it you'll find answers to the key questions that plague the consciences of individuals and the policies of business organizations.

Many far-sighted manufacturing companies have seen the political frontier for plant management for a long while. Most notable among them have been General Electric, Monsanto, Gulf, Ford, Armstrong Cork, Pillsbury, and Timken. The list numbers over 200. The National Industrial Conference Board last autumn surveyed 198 companies and concluded that the majority believed that "companies, acting through their executives and employees, should take an active part in the political and governmental process . . . although they disagree as to the extent and the nature of such participation."

Responding to an inquiry from FACTORY's Washington bureau regarding political action for plant people, Vice President Richard Nixon said in part, "Both of our parties need new blood and new leadership, not just at the top, but in the states, in the districts, in the counties, and in the precincts. When an individual takes the time to participate in a party organization and when he takes the time to help select the right kind of candidate for his party, he serves his country; because the stronger the candidate that one party puts up, the stronger the candidate the other party puts up.

"I urge you (businessmen) to work not simply in the two-month period of a presidential campaign when everybody is excited, but over the long haul, developing the strong political organizations that will push to the top, not the mediocre, but the best that the country can produce."

FACTORY echoes Mr. Nixon's viewpoint. We urge that you—that all people engaged in the management of plant operations—cross into the political arena, regardless of party, regardless of job, and regardless of issue. It's fast becoming a part of your responsibility.

L. R. Bittel

EDITOR-IN-CHIEF

COVER STORY

These four men are applying . . .

BLAY, plant manager: "We expect to keep growing, so we plan for power growth as we plan for production growth."

A PLANNED REMEDY

When the plant came to life in 1937 engineers had carefully provided it with a better-than-average electrical system to power its widely scattered production machinery.

But as the industry grew, so did the plant. Today the General Motors Buick-Oldsmobile-Pontiac assembly facility turns out four times as many cars as it did in 1937. And it consumes six times as much electrical power.

Since 1950 the factory has had electrical growing pains.

Here's how and why the pains developed.

ORIGIN OF THE GROWING PAIN

The original electrical system capacity was 5000 kva., adequate for the needs of a 25-autos-per-hour assembly plant 23 years ago. Another transformer bank was added in 1941 to raise the total to 7500 kva. That layout saw the plant through the war and several years into the postwar period.

In the early 1950's power usage really started to climb. Two factors were responsible. (Chart on facing page shows what was happening.) Both the total number of automobiles produced per year and the kilowatt hours used per auto assembled were climbing. More lights, more welders, more motors were going on the line as each change in production or office facility was scheduled. And, of course, the total plant demand was coming more and more close to system capacity. (Demand during peak production months ranges 10% to 25% above the average month's figures on the curve.)

Plant management at Linden could see the growing pains intensifying. Thanks to GM's engineering training program, they were able to plan a remedy. In early 1950 Leonard Hostetter, a co-op engineering student at General Motors Institute (Flint, Mich.), was assigned to the plant engineering group at Linden during his off-campus training periods, and eventually to full-time work at the plant. Hostetter's choice of a fifth-year thesis in 1955—the redesign of the electrical system at the Linden plant—came as no surprise.

Hostetter began the job of sizing up the plant's existing and future problems by spending several weeks getting at the facts. With the occasional aid of an electrician, he set out methodically to find out exactly what loads were being carried on each important feeder and each major piece of distribution equipment in the system. (GM had the necessary clamp-on recording instruments.)

As data were obtained, a revised single-line diagram was drawn. (Many unrecorded changes in the system had been made.) Where it was easy to do, some overloads and load inequalities were corrected immediately. Time required for the study and planning was 1200 hours, primarily Hostetter's time.

When a clear picture of the plant's electrical condition emerged, it was obvious some new equipment had to be bought right away. One new 3000-kva. double-ended substation in the production area, and one 500-kva. single-ended substation in the boiler house would correct the most serious shortcomings. Their installation raised available kva. sufficiently to keep the plant out of trouble for the next few years. So the two subs and related equipment became first steps in the long-range plan.

How GM Engineers Electrical Improvements

At GM's Linden (N.J.) plant, origination of electrical improvements is not limited to the plant engineering department. For example, production supervisors may originate a request for changes in lighting, motor control, ventilating equipment, and the like. This original suggestion is then checked by the work standards department and passed by it to the plant engineering department for cost estimating.

The plant's chief electrician is consulted on most cost estimates, because his staff is thoroughly familiar with all plant areas, construction problems, and previous job problems.

After a project receives a price tag, it goes to Production Manager Katko, then to Plant Manager Blay for approvals.

Large projects, involving major expense and engineering, require approval from GM headquarters. The final engineering of major system changes is generally handled through the company's Argonaut Realty Division in Detroit.

KATKO, production manager: "We can't afford the luxury of electrical downtime or drawback of a poorly planned system."

MARKEN, plant engineer: "I wouldn't want to run any plant engineering operation without EE experience on my staff."

HOSTETTER, electrical engineer: "You have to plan every electrical improvement so that it will still make sense in 10 years."

FOR ELECTRICAL GROWING PAINS

TELL-TALE SYMPTOMS

Unless your plant is in the upper bracket electrically, you'll probably recognize many of the troubles that turned up at GM. Take a few minutes to run down this list of symptoms. See how GM diagnosed them and quickly applied the soothing remedy. There are some good ideas here for almost any plant.

An aging plant

At the time of the Hostetter study, almost all the equipment in the plant was nearly 20 years old. Many of the transformers and conductors had carried full load, even some overload, for long periods. (One of two transformer banks that had been paralleled had to carry nearly twice the rated load for several days following a lightning storm in 1955.) There was practically no alternate equipment available anywhere in the system that could be used if any major component broke down.

With production dependent on these few critical elements, it didn't make sense to take unnecessary chances with old equipment, most of which was already written off. Under the new long-range plan, the Linden plant will retire older equipment first—and scrap a good deal of it.

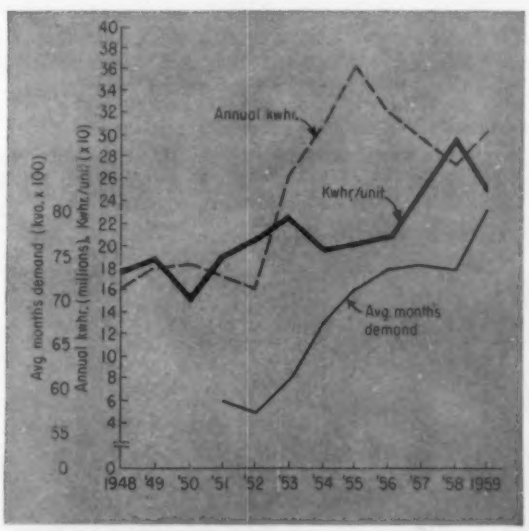
Inadequate equipment

At the time of the survey, main substation switching was handled through two sets of wall-mounted 4160-volt knife switches in the combined substation and load center (located on the roof near the center of the plant). Switches were enclosed in wood cabinets. The two switches were fed from four 4160-volt lines, all coming from a common source at a nearby utility substation. Both sets of switches fed a common bus through oil circuit breakers. Connected to the common bus in the same line-up of breakers were five additional oil breakers supplying all the loads in the plant.

In the years following the birth of the Linden plant, many new plants sprang up in the neighborhood. Also, established industries had increasing need for power. Utility line capacity had to be increased accordingly. Originally, the two 50,000-kva. interrupting capacity main breakers were adequate to interrupt maximum short circuit energy available at the switchgear bus when the plant was built. Today it requires several times as much interrupting capacity to properly protect the same main bus. For the last several years GM's protection has actually been supplied by the breakers in the utility substation, which are set to trip several cycles before GM's in case of a major fault.

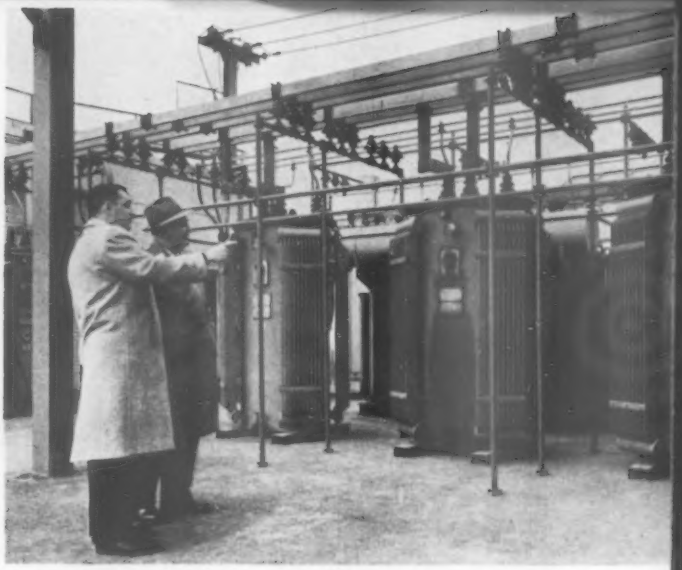
Depending on somebody else's equipment to protect yourself is never completely satisfactory. This is particularly true when your own first line of defense for faults is old oil breakers. A relay malfunction during a major fault could cause a fire or accident that might result in costly plant shutdown.

The study showed several solutions to the relay problem. Choice was a matter of economics—though an immediate decision was prevented by the utility's reluctance to continue supplying additional increments of power at 4160 volts. If GM had to put in its own transformers and buy power at 27 kv., all new main breakers would be needed, and any 4160-volt breakers or switchgear bought for interim use


Annual kwhr.
Kwhr/unit
Avg. months demand
Avg months demand (kva. x 100)
Annual kwhr. (millions) & Kwhr/unit (x 10)
1948 '49 '50 '51 '52 '53 '54 '55 '56 '57 '58 1959

MORE KWHRS., more demand, more power used per auto assembled—GM's Linden plant follows auto industry trend.

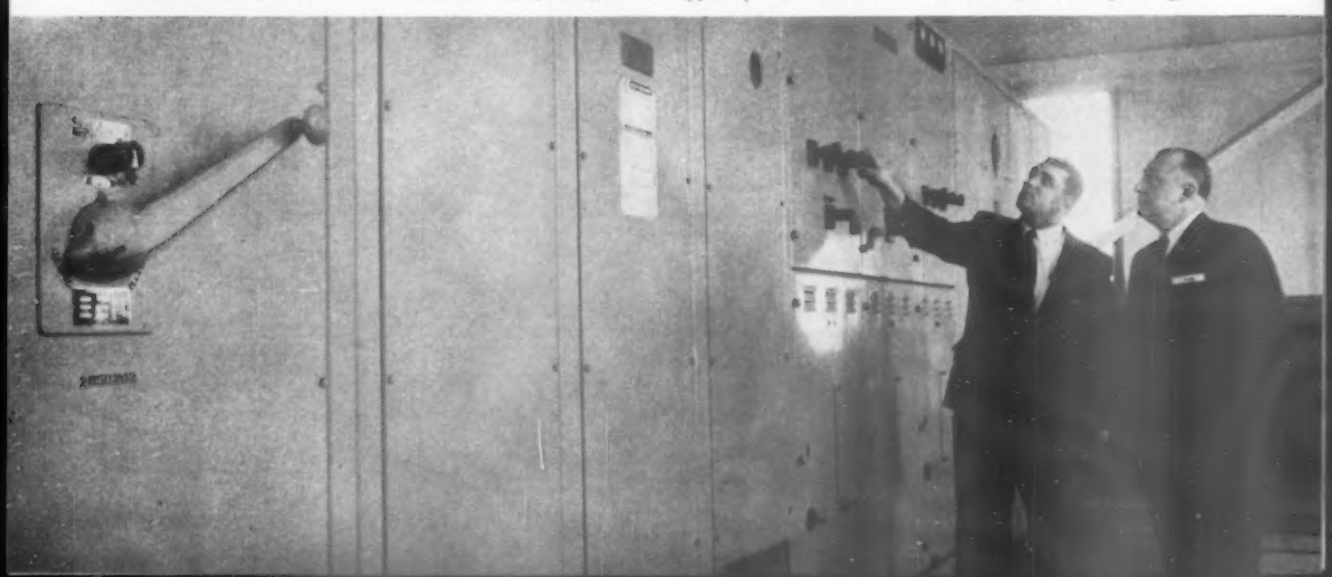
"We'll discard these old oil breakers by late summer," reports EE Hostetter (left, above) to plant engineering manager Marken.



"And we'll soon move out these obsolete transformers, thanks to our electrical improvement program," continues Hostetter.

"A 3000-kva. stubstation going in this summer is another place where long-range planning is paying off." The foundation pad was incorporated into the roof of a 1957 body shop addition (above). To build substation from scratch today would cost $20,000 more."

"The substation will be double-ended—like this one (below), which supplies power for our infra-red ovens (see cover painting)."



would involve more expense than was warranted by the need.

So the answer seemed to lie in continued negotiations with the utility. When it became clear that there was no economic alternative, plans were approved for a 26.4- to 4.16-kv. substation adjacent to the plant. It will be installed during the annual plant shutdown for model changeover late this summer. Two 10,000/12,500-kva. transformers with separate feeders from different utility sources will supply service. GM will have its own 26.4-kv., 1,500,000-kva. main breakers ahead of the transformers, adequate to handle short circuit currents for a long time ahead. The 4160-volt feeders now supplying the plant will be doubled in capacity and the main substation will become the combined load center substation and switching center. And all oil breakers will be replaced with 4160-volt air breakers, as will be described later.

Out of this move will come a long list of advantages to the plant. First, GM will get primary power at a cheaper rate. Second, the Linden facility will have adequate system capacity to take care of 5 to 10 years of normal electrical growth. Third, engineering will have the assurance of dual incoming supply, and no worry about faults endangering personnel or equipment.

Inadequate reserve capacity

Prior to the Hostetter study, GM's production plans had been hamstrung by inadequate electrical capacity. Improvements made since the study are helping. The goal of GM's plant engineering department is to evolve a system that makes the production planner's job easy—by eliminating worry over electrical inadequacies.

For several years production has been in need of additional paint department assembly-line space. Easiest way to get it was to convert long steam-heated drying ovens to infra-red ovens that took only half the floor space. But the extra 400-500 kva. for each oven hasn't been easy to come by. By juggling feeder loads in the area, six new ovens have been installed. But more are needed and no more capacity is available until later this year when the new main substation goes in. Meantime, cooling tunnels are being put in at the output end of existing ovens to drop body temperatures faster, enabling touch-up painting to be done without waiting for ambient air cooling. Fortunately, cooling tunnels require only an average 25 kva. each.

As much as any other factor, the constantly increasing use of resistance welding has been a continuing cause of power shortages at GM. Auto assembly used to require about 100 welding units. Today the Linden plant needs over 400. Ratings are up, too—many of the newer units are rated 200 kva. Preliminary plans for 1961 model production show no change in the trend.

There's no way to short-change welding loads. Inadequate power shows up immediately in faulty welds. Thus, much planning time (and improvement) has been tied up in trying to keep up with welding load changes. To add to the problem, location of the center of welding load has shifted several hundred feet as assembly and fabrication processes have changed. To meet these continual changes, one 3000-kva. load center substation was installed while the survey was in progress. This took care of most of the infra-red ovens and removed part of the power and lighting load from the main load center. Transformers at both ends of the 3000-kva. sub are fed from the same feeder breaker at the main sub. But plans call for alternate feed to be put in soon, so that equipment failure or maintenance outage will not tie up an entire area of the plant.

Absence of flexibility

The study showed a number of system improvements that could be made to add flexibility to the present layout and to future equipment. There were practically no alternate primary feeders available for any plant load (this meant maintenance and construction work had to wait until production was shut down). No interconnections have been available between adjacent secondary (480-volt) systems. When an emergency occurred, production had to be penalized. There was no alternate source that could be cut into service by closing adjacent breakers.

These ills have not had the priority attention that the problems of inadequate capacity have had. For this reason, few solutions have been provided up to now. However, this year's major changes will include flexibility provisions along with separate feeders. Several secondary interconnecting ties are also being planned.

Some Key Points in GM's Planning

- Lighting, convenience, and small motor loads in auto assembly areas will run just under 4-kva. per 100 square feet. This figure will permit GM to plan for a wide variety of plant operations and leaves reasonable margin for variations in area loads. It does not include heavy welding loads or motors in the 25-hp. range and above.
- Every system change is planned so it will make sense 10 years from now. It's far cheaper to make provision for electrical growth when an addition is being planned than to wait until loads demand it (and production has to be hampered while the changes are made). Invariably, planning, too, will cost more in the long run.
- Regular checks are performed on loading of all feeders. If loads go up, GM finds out why. Feeder loads are kept balanced. Transformers and major equipment are loaded at about two thirds of capacity. In an emergency, alternate or adjacent equipment can carry the essential overload.
- Electrical planning is considered an integral part of the job of good plant management.
- Plant load will double about every 10 years.
- Electrical equipment is expected to be obsolete in 20 years, much of it in less time.

Photography in this article by Joe Ruskin, McGraw-Hill staff.

Spending in the '60s

According to the just-completed McGraw-Hill Survey of Business Spending Plans, your company must take these steps to stay abreast of competition in the years ahead:

- **Spend 16% more for new plants and equipment**
- **Concentrate on modernization, not just expansion**
- **Step up its introduction of new products**

THE SURVEY SHOWS . . .

. . . continuing modernization of manufacturing plants. Two thirds of next year's $15.2-billion record total will be devoted to replacement and modernization. The aim: to increase productivity and reduce manufacturing costs.

As the chart opposite shows, the chemical industry leads all others in expansion plans, earmarking 63% of its $1.7-billion plant-and-equipment budget for expanding capacity. But chemicals stick out like a sore thumb among all other industries. On the other side, machinery manufacturers plan to spend two thirds of their dollars on *replacing* buildings and machinery. The extreme case is petroleum refining—91% for modernization.

Despite increasing outlays for new plants and equipment, manufacturing capacities are still expected to increase only 5%. This is the smallest planned increase in almost 10 years—1958 being the only exception.

One reason for going slow on increased capacities was last year's operating rate of 85% of capacity, 9% below the preferred rate of 94%. Yet the picture may switch. If sales forecasts reach the expected 17% growth, most industries will need additional capacity by 1963.

Percentages alone do not tell the full story. The 35% devoted this year to expansion is the same as last year, but there will be an additional $2.1-billion to spend for modernization. The reason: The total planned by all manufacturers for modernization and expansion has risen this year from $12- to $15.2-billion.

WHERE THE MONEY WILL BE SPENT . . .

The largest proportion of expenditures for new plants and equipment will center in the Midwest. One third of all new plants and equipment will go into Ohio, Michigan, and surrounding states. By contrast, both the New England and the South Atlantic states will receive fewer shares of the nation's total investment.

Although the West still lags behind the Midwest, South, and Middle Atlantic regions in attracting manufacturing plants, it is annually increasing its share by 2% of the total dollars invested. And within the next two years the West is expected to show a gain over the South Atlantic states in new plant investments.

WHERE THE MONEY WILL COME FROM . . .

Most companies find their money principally from depreciation allowances. Two thirds of the money spent this year will come from this single source. By 1963 manufacturers will have over $9-billion available from this tax-allowable bit of bookkeeping, an increase of 12½% over this year's depreciation allowance of $8-billion.

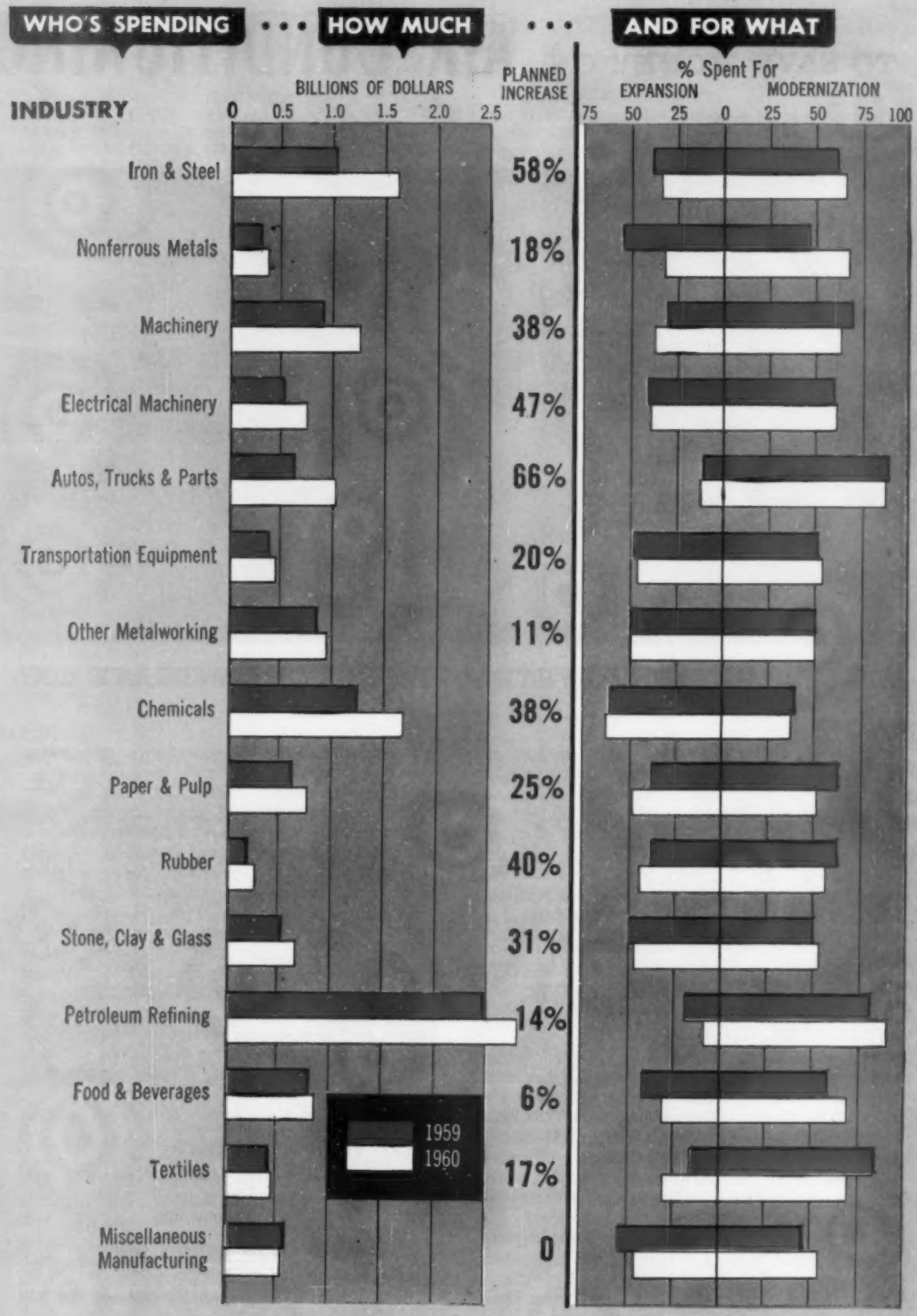
Manufacturers admit to spending all their depreciation allowances for new plants and equipment. The only industry planning to spend less than its allowance this year is non-ferrous metals. All others will look for additional money in retained earnings, depletion allowances, and borrowed money to keep up with competition.

THE EFFECTS OF RESEARCH AND DEVELOPMENT . . .

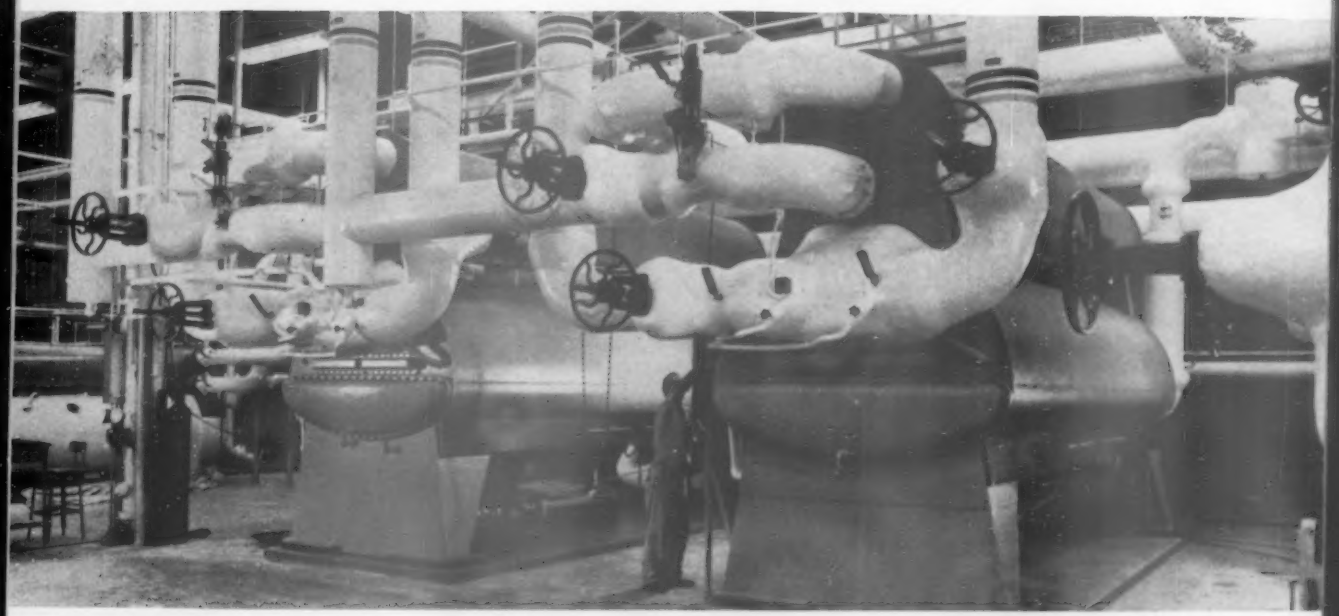
If you are not planning to erect plants or install equipment for new products, watch out for your competitor! At least one third of the companies surveyed report that a significant share of their 1960 money for new plants and equipment is earmarked for producing brand-new products.

The largest increase in new products is in transportation equipment—the new jets being the principal reason. But even machinery manufacturers forecast 25% of 1963 sales will be new products.

If all these spending plans do come true—and it looks as if they will now that first-quarter reports are in—1960 looks like a banner year. But before you settle back on your contented derrière, check again the charts at the right. Are you sure of where you stand with your competitor?


WHO'S SPENDING
HOW MUCH
AND FOR WHAT
INDUSTRY
BILLIONS OF DOLLARS
0
0.5
1.0
1.5
2.0
2.5
PLANNED INCREASE
% Spent For
EXPANSION
MODERNIZATION
75
50
25
0
25
50
75
100
Iron & Steel
58%
Nonferrous Metals
18%
Machinery
38%
Electrical Machinery
47%
Autos, Trucks & Parts
66%
Transportation Equipment
20%
Other Metalworking
11%
Chemicals
38%
Paper & Pulp
25%
Rubber
40%
Stone, Clay & Glass
31%
Petroleum Refining
14%
Food & Beverages
6%
Textiles
17%
Miscellaneous Manufacturing
0
1959
1960

TO SAVE MONEY ON AIR CONDITIONING...



...GET THE RIGHT SYSTEM—THEN CONCENTRATE ON

How would you like to lop off 5% to 20% of your annual air-conditioning running costs—off the price you're paying for labor and materials to operate, maintain, and repair the system? Chances are you can with just a little bit of effort.

To help you find ways to get more for your air-conditioning dollar, FACTORY invited the system designers and service engineers of Carrier Corporation, Syracuse, N.Y., to contribute their knowledge and experience. The result: a fine collection of excellent suggestions. Here they are:

To save money on air conditioning . . .

START WITH THE BEST SYSTEM

It's axiomatic that the properly designed system will cost least to operate and maintain. Picking a large enough refrigeration plant at the start will forestall the cost of adding capacity later. The large system won't cost any more to operate. An under-loaded machine will last longer than an over-loaded one. Two-speed fans and two-speed pump motors can also save money by reducing output when load requirements are cut down, as on a weekend.

Here are more money-saving ideas for selection of system components:

- Filters, including the new automatic dry-type.
- Absorption refrigeration machines using low-pressure steam instead of electricity (in areas where steam rates are low or there's excess steam).
- Modulating controls (rather than on-off type) for gradual control instead of sudden air blasts.
- Better materials on primary air-handling apparatus to prevent corrosion, withstand abuse.
- Humidity as well as temperature control to attain more comfort at nearly equal operating costs.
- Use of two water chillers (in parallel at peak loads) so partial loads can be handled by one machine.

Your air conditioning costs will also be held in check if you keep your equipment up to date. Older systems may benefit by modernization. Examples: An absorption machine or a small centrifugal compressor may economically replace an old reciprocating compressor. Self-cleaning nozzles can eliminate sump screens (and cleaning) in spray equipment.

To save money on air conditioning . . .

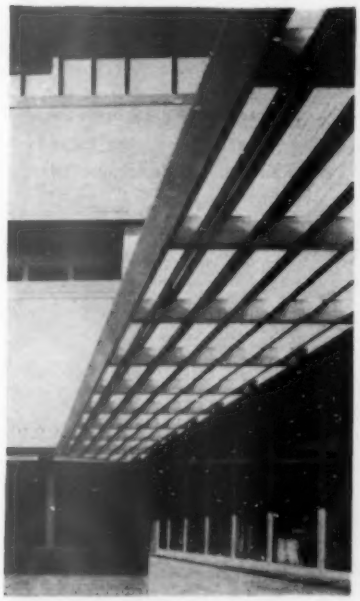
MAKE YOUR PLANT HELP

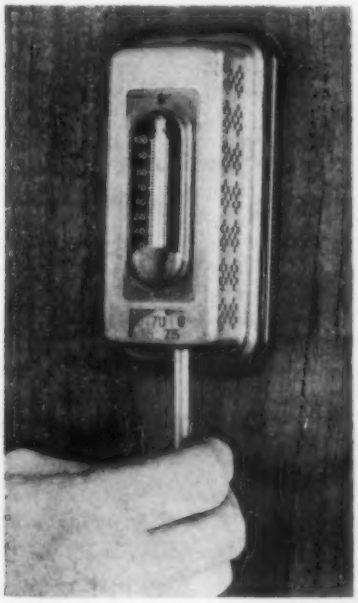
It can be a major source of air conditioning savings, just as a well-insulated plant can help trim heating costs in winter. Here are some tips:

Use building design for operating economies

In a new plant, for example, orientation of the building with shortest walls on the east and west will

THE RIGHT SYSTEM can either be huge (like these absorption units at the American Airlines base in Tulsa) or tiny, to meet the needs of a small, static plant. **YOUR PLANT** can aid cooling with devices such as sun shades, drapes, and insulation. **YOUR OPERATION** will benefit from simple measures like key-operated thermostats. You need expert **MAINTENANCE** men.





YOUR PLANT... YOUR OPERATION...MAINTENANCE

reduce heat load. Use light-colored exterior materials. Use shade trees liberally, especially on east and west sides. Vapor seals in plant and office walls will reduce humidity and sweating on surfaces.

Reduce the solar heat load by shading windows

You can use shades, or even close off window openings with special glass block or glass tile. Heat-reflecting glass is also a good idea. Another is to seal the cracks in windows and frames and keep all windows closed. These practices will reduce drafts, air leakage, and temperature variations (caused by the sun on the east side in the morning and on the west side in the afternoon), thus minimize zoning requirements. Outside shading, such as a ventilated light-colored awning or a roof overhang, is more effective than interior shades.

Insulate the roof to reduce sun load

It will also cut winter heating bills. Check the extra cost—it may prove worthwhile. Roofs of existing buildings can be treated with one or two inches of insulating material directly underneath the roof. An aluminum roof or one with light-colored gravel or painted surface helps reflect solar heat. Some plants like roof-cooling spray systems, but there is a risk of algae formation, and wet drift from the wind is an inconvenience.

To save money on air conditioning . . .

SHARPEN YOUR OPERATING PRACTICES

Auto engineers claim the most important single element in gasoline mileage is the driver. And in the case of your plant's cool air mileage, the driver is you —the man who manages the air-conditioning problems in the plant. Here's help:

Provide tamper-proof thermostats

There are always employees who monkey with controls. Such tampering upsets system balance. So place thermostats out of reach. Or use a key-operated type. Take handles off steam and water valves.

Apply stratification technique

In a high-ceilinged plant it is often impractical to air-condition the entire cross-section from floor to ceiling. Consider a re-design of the air distribution system to produce a stratified layer at floor level. Often this can be done by changing deflection of air outlets, or by installing new ones. In one plant this cut the refrigeration load about 20%.

Rezone the duct system

Perhaps the layout of machinery and people has been changed since the system was first installed. Or a department with heat-emitting apparatus has been

shifted. This will reduce the effectiveness of the original duct system. To restore it, either relocate the duct system to match, or relocate the machinery, whichever is least expensive.

Let your system run continuously

If a system is shut down in some plants at night in summer, the plant interior warms up. So when the system is turned on the next morning, it not only has to combat the heat load for the day, but also the heat stored in machines, walls, and ceiling. Thus it might have to run at full demand all day. But if a night watchman starts a system at midnight Sunday, it will unload itself before morning. Thus the plant saves money through lowered demand on the refrigeration machine. If interior loads have increased and the plant has run short of refrigeration capacity, it may help to let the machine run all night with the thermostat set at slightly lower than comfortable temperature, say 68-70 F. The resulting "cold storage" effect will help maintain design conditions of the plant throughout the following day.

Check employee comfort periodically

If workers find they like temperatures higher or lower, you can regulate thermostats accordingly. People like different temperatures in winter than in summer, because of humidity. In most new buildings the system is started up and balanced before full occupancy. Existing buildings may have been altered. Each case calls for rebalancing.

Let natural climate help

During spring and fall, the refrigeration machine may be turned off on many days when the outside air is cool enough. A good system will provide a changeover switch that will convert the system from the one operation to the other, with continued automatic control of interior conditions.

Screen off heat and fume sources

Reduce air consumed by hoods and exhausts by good design, such as the new slot arrangement. Air brought in to replace exhausted air can be fed in at the hood itself or nearby. This reduces amount of air that's cooled before being exhausted.

Reduce outside air intake

Less outside air is needed than most people think. When the system is first installed, the design engineer may determine the proper amount based on odors, fumes, and concentration of people in any work area. There are established rules of thumb for this, but often they may provide more ventilation than needed for employee health. It's not a matter of oxygen but of stagnation. Normal infiltration of air will often provide enough oxygen.

After the system has been installed and balanced, further experimentation with air-damper linkage to take in less air may cut operating costs. Close the damper down until workers feel they need more fresh air, then open slightly. This reduces the quantity of air you have to heat, cool, filter, and condition.

To save money on air conditioning . . .

USE SKILLED MAINTENANCE PERSONNEL

The increasing use of automatic controls often eliminates the need for an operating engineer in all but large plants having complex air-conditioning systems. It re-emphasizes the need, however, for skilled maintenance attention—regular inspections, regular service, and proper adjustments and repairs—by expert personnel. Amateur attention may overlook inefficient operating conditions, malfunctioning, and need for repairs. All these lead to major shutdown of systems followed by expensive repairs or replacement. There are two ways to insure expert attention: (1) Train your own personnel, (2) buy a service-maintenance contract, and (3) follow these suggestions:

Keep daily operating logs

They should include temperature and humidity (inside and outside) by the hour. An accurate record of outside weather conditions may reveal that the refrigeration machine can be operated less frequently. Be alert, and tie outside conditions to the refrigeration requirements. Daily records of bearing temperatures, oil levels, and so on, will reveal any variations in system operation. Increases in power costs from year to year indicate efficiency drops and possible machine malfunction.

Check the system regularly

A good inspection routine, guided by a checklist will prevent many breakdowns and extend the life of the system. Even more, scheduled inspection of smaller components often uncovers costly leaks in the dike. This includes checking and adjustment of items such as duct outlets, reheat coils, fans, and louver dampers. For example, if the damper control fails or is not properly sequenced, unwanted outside air may leak in and impose an added load on the equipment. Proper maintenance of controls prevents equipment damage through faulty operation.

Service the system regularly

Like those in your automobile, components of an air-conditioning system need periodic servicing to function efficiently. Dirty filters impair air movement, reduce system capacity. Improper water treatment (or lack of it) may cause scaling in the tubes of the refrigeration machine, with as much as a 20% loss in system capacity before safety cut-outs turn the machine off. Cooling coils can become clogged between fins, yet appear clean. Dirty ducts and fans add to friction load and restrict air flow. Clogged spray nozzles curtail performance. Worn and slipping fan belts cut air-handling capacity.

Make prompt repairs

Often system defects—especially small ones—are overlooked because they don't affect continuing operation. But they can boost running costs, like worn spark plugs in a car. For example, a slightly leaking steam valve on a reheating coil can waste more steam in a year than is used in operation.

MR. OUTSIDE
Mauro Checchio, Assistant to the President, Personal Products Corp.

SHOULD YOU PLANT MANAGEMENT PLAY THE GAME OF POLITICS?

MR. INSIDE
Subby Urso, Production Supervisor Roytype Div., Royal McBee Corp.

Mauro Checchio (Mr. Outside) and Subby Urso (Mr. Inside) are already playing the game of politics. They've found the arena strewn with obstacles—social, legal, and financial. They've found the field occupied by a score of contenders—each claiming the best strategy for playing a successful game.

What are the obstacles? Which is the best strategy for you? Should you play the game at all?

Before you decide—behold the arena as it really is.

TURN THE PAGE

By Lawrence F. Mihlon, Assistant Editor, FACTORY

YOU

PLANT MANAGEMENT

PLAY THE GAME OF POLITICS?

The office door flew open. The young manager exploded into the room.

"Here's your politician, start firing the questions."

The politician: Mauro A. Checchio (Mr. Outside), 35-year-old whirlwind, father of five, ex-plant manager, and now assistant to the president of Personal Products Corporation (Milltown, N. J.). He's also Republican mayor of Scotch Plains, N. J., a thriving town of 20,000 citizens.

Checchio is one of many management men following the road to political adventure. Others are on the road, too. Men like Sebastian "Subby" Urso (Mr. Inside), 45-year-old Royal McBee (Hartford, Conn.) production supervisor. Urso's quiet manner belies an electric desire to apply management skills in public service. For 12 years he has been a Democratic party organizer in Hartford's Third District.

Says Subby: "I play politics 365 days a year, not just at election time."

Mr. Outside and Mr. Inside are sharply drawn examples of what might be called a political action renaissance in industry.

Today there are an estimated 60,000 management citizens engaged in politics. They work through hundreds of companies—large and small—and a score of regional manufacturers' associations. Mostly they're active only in an academic way—that is, enrolled in any one of several courses in practical politics. The U.S. Chamber of Commerce alone claims 2500 classes held during the past year involving some 42,000 industry citizens. Others, like the National Association of Manufacturers, claim somewhat fewer students, but just as much success. Many regional or state associations, after studying the Chamber and NAM plans, have designed their own courses to meet the needs dictated by their particular area.

(The above figures can be misleading. Of the hundreds of U. S. companies there are but a few actually sporting political action programs. Some of the largest and most influential (like Kodak and General Foods) are conspicuously absent from the list right now.)

In general, these packaged courses in practical politics are basic attempts at explaining the social, legal, and administrative gymnastics of regional and national government. The emphasis in each is on the "grass roots" or local sector. Reason: Most sages have agreed that management men, to be really effective in reorienting government to the facts of business life, must reach the people in a plant's immediate area. Each plant is extremely careful to keep its instruction strictly nonpartisan.

Whichever instruction you or your company selects, you'll be getting a splendid introduction to the fundamentals of civics—fundamentals that were somehow left out of most of our formal educations. Says Checchio: "When it comes to politics the average industrial management man is as helpless as a barracuda without teeth."

But education is not enough. Without the spirit to act and the muscle tone to move deftly through the tough political beefsteak, the teeth of education decay and become worthless.

POLITICAL GAME STARTS with local behind-the-scenes strategy meetings where platform and candidates are put through warm-up stages. It's here that management skills are put to best use, say some party experts.

PHILOSOPHY OF BIRTH

Perhaps the theory that education does not stimulate results *was* the reason for the political encouragement program that is gaining favor today. But there are other reasons. What are they?

If you're a callous, weather-worn management man, your immediate answer to that question might be: "To beat the hell out of the unions in the race for government influence."

If you answered that way, you're not alone. At least one other authority, labor columnist Victor Riesel, feels the same way.

He says: "The side (labor-management) that influences government will come out ahead."

But it's this kind of thinking that puts the kiss of death on any attempt to play politics, according to many enlightened top-management men.

Thomas R. Reid, director, Civic and Governmental Affairs Office, Ford Motor Company, prefers to put it this way:

"The *individual* that influences government comes out ahead . . . the simple employment of management skills in politics will ensure democratic processes and nullify any extreme pressure group. Labor and management are not on opposite sides of the political fence."

Reid indicated (in an exclusive interview) that it is probably true that labor and management, as institutions, traditionally disagree on certain basic issues. But labor and management individuals have the same personal interest at heart.

Politico-manager Checchio says this:

"No matter who the guy is, he wants honest government that's well-managed and economically sound. The good manager can bring skills into a political organization that will contribute to this kind of good government."

From Subby Urso, Royal McBee's Mr. Inside, comes this observation, based on the political facts of life:

"To say we're going into politics to beat out labor is ridiculous. There are just as many potential Republicans in the labor ranks as there are Democrats in the management ranks.

"The key man in any democratic process is the independent voter. The management man can really help in the job of stimulating him to vote."

One thing is certain. Once exposed to the fundamentals of political operations, the management man *can* make a healthy contribution to government.

A PLAN FOR ACTION

"To be really effective, the game of politics should become an integral part of the everyday management function," booms heavy-set, imposing Tom Reid of Ford.

From his office in Dearborn, Mich., he rules over what is perhaps the most sophisticated political affairs program in industry today. As director of Ford's new Civic and Governmental Affairs Office, the politically astute former Baltimore politician coordinates the operations of 45 skilled people.

Reid's immediate assistant is Horace E. Sheldon, scholarly manager of Ford's unique regional network. The network consists of eight Field Offices of Civic and Governmental Affairs, located in each of the major Ford manufacturing areas throughout the country. Each of the eight regional managers is a professional in the field of political and governmental affairs. Only two of the group come from within the Ford organization. Party sympathies of the group are split about fifty-fifty, GOP and Democrat.

Typical of the kind of man Ford selected for the job is Trenton area manager M. T. J. "Mike" McMahon, a 32-year-old former insider in Jersey Boss Frank Hague's Hudson County machine. Rosy-cheeked, hatless, he's the owner of a deep mellow voice charged with confidence and has the suave manner of a Washington veteran.

Asked how sincere Ford is about encouraging nonpartisan political activity, McMahon says:

"One of the chief reasons for the regional set-up is to ensure that company management does not exert 'unusual pressure' on employees who take the company at its word and get elected to office.

"Introspective coercion of this man, such as threatening job security if the legislative balance does not swing in Ford's favor, is stopped in every instance.

"We make no attempt to hide the fact that the other side of this office (Governmental Affairs) is shooting at legislative advantage for business."

What is the Ford formula for success in politics? It's one that might well be considered by every company, large and small. It appears in the panel below.

Turn the page

FORD'S NINE-STEP APPROACH TO POLITICAL ACTIVITY

1. Study impact of governmental affairs at all levels of your business. Determine extent to which these matters affect your business operations directly.

2. Consider social responsibility of your company to the community, the state, and the nation.

3. Prepare written statement of policy regarding company position on: public issues and legislative action directly affecting your business; and encouraging employees to participate in civic affairs.

4. Using policy as a guide, inform and educate employees on the importance of participation in public and political affairs. Let them see their own stake in these matters.

5. Determine how many employees are active in civic affairs, as elected or party officials, or service workers. Make it clear you are not checking on party affiliation.

6. Arrange for local or state elected representatives to visit plants and offices to get acquainted.

7. Devote reasonable percentage of total content of employee papers and management bulletins to politics.

8. Designate an executive within the company who will be responsible for the function of civic and governmental affairs. Depending on company size, he will be full or part time. Important thing is to specify the function.

9. Think of your public affairs program as a continuing, added dimension of company (and management) activity.

". . . SHOULD YOU PLANT MANAGEMENT PLAY THE GAME OF POLITICS?

WHAT A SMALL COMPANY CAN DO

Admittedly, the Ford approach is big-company-born-and-raised, and involves the outlay of sums well into the six-figure class. What about the hundreds of smaller companies whose participation in political activity is vital to the success of the move?

To answer that question, listen in to a conversation with Richard F. Dede, vice president of Hoboken-based New Jersey Machine Corporation (NJM). Dede's company manufactures packaging and labeling machinery.

NJM's 66,000-sq.-ft. plant is operated by 190 shop and office workers (130 shop, 60 office).

Says Dede: "Early in 1958 I heard a speech at a National Metal Trades Association meeting urging business participation as a matter of survival . . . it started me thinking.

"Then about a year later I heard another talk by the same fellow. This time I decided to do something about the political apathy I discovered in our plant."

Dede looked around at the various education programs available and eventually selected the U.S. Chamber's "Action" package. A brief review of the plan with NJM President George von Hofe brought approval.

Here's how Dede started the program: NJM extended enrollment invitations to all plant and office supervisory personnel and sales engineers. The group, 30 in all, decided on a 7 a.m. to 8 a.m. class period for the weekly meetings that would go on for nine weeks.

Participation was voluntary. There was no compensation. NJM provided coffee and buns for the early bird students.

Dede reports 100% attendance by all but the traveling sales engineers. A few of the students worked in their party organization during last year's local election (course started in October).

"Up to this time our employees really didn't give a damn for politics," says Dede.

Dede himself was spurred into action during the course and has since become a Republican committeeman in his Rockville Centre (Long Island, N. Y.) home government. He works "behind the scenes" as an organizer because "caliber matters here too."

NJM's plans for the future include monthly meetings with former students to discuss major issues of the day and to urge personal expression—something that isn't provided for in the package. In addition, each employee newsletter from now on will include a special public affairs column.

Total cost of the program: negligible.

INSIDE THE ASSOCIATION PLAN

No report on the contenders jammed into the management political arena would be complete without a look at the group or association approach.

One of the newest is the Public Affairs Action program of Associated Industries of Massachusetts (AIM).

Sparkplug of AIM's Freedom Foundation award-winning program is articulate, soft-voiced John Hamilton.

CONTEST FEVER REACHES HEIGHTS at party nominating conventions where national delegates give seal of approval and support to nominees and platform. Politico-managers can play vital role here. (Wide World Photo)

Hamilton, 31, received his industry training with the ubiquitous G-E employee and community relations group before coming to AIM in 1958 as PR director.

AIM makes no bones about its purpose in life: to improve the business climate in the Commonwealth of Massachusetts. The AIM program urges its members to deal *as businessmen* with two new groups vital to the survival of our way of life—voters and public officials.

The organization's attack is planned around state senatorial districts. To get a program rolling, a cooperative company president is inducted into sponsorship of the AIM education series. He signs all invitations to the first AIM-prepared workshop and he makes the keynote address. There are three of these workshops, led by the local industrialists themselves. After the third meeting the group is, for all intents and purposes, set free in the political arena to champion the cause of management. Of course, AIM is still available for consultation.

Included in the AIM package are two Hamilton-composed pamphlets titled: "How to Influence Your Legislators" and "How to Influence Voters."

In the first pamphlet, the public-spirited plant manager can find tips on: how to meet your legislators; what public and AIM-prepared documents to study before taking action; and how to take action to influence—i.e., the art of letter writing, personal contact with legislators, and testifying before committee hearings.

The second pamphlet deals with the best "tried-and-true ways" to sway the average Commonwealth voter. Subtitle: A Low-Budget Communication Program.

Features of this presentation are: short cuts to recruiting a management team to attack in this sticky area, and ways to select the proper media for your message. Suggestions for media include: meeting with employees (since AIM concentrates on the small manufacturer, it feels this is the most effective method of getting the management message across to a receptive, even if captive, audience); plant bulletin boards, direct mail, company publications, regular plant tours for townsfolk, management speaking engagements, local press and radio, community relations programs, and stockholder communications (AIM feels this is the greatest untapped source of political cooperation).

What does AIM think of companies encouraging employee participation in the actual political process?

Hamilton feels this is a fine and patriotic way to do a public service, but this decision should be left up to each company. Of course, if one of AIM's members seeks advice in this vital area, the association will gladly extend the service.

Says Hamilton: "It's easy to get into politics—just pick up the phone, call the local chairman of the party of your choice, and ask to be put to work."

THE LEGAL CLOUD COVERS ALL

Big company, small company, or statewide association. Regardless of the size and extent of the program, one thing each has in common is a concern for the legal thorns placed in the political arena by state and federal lawmakers (lawmakers whom your program is supposed to enlighten).

In reviewing the programs of several major companies, there is a startling lack of written or announced preparation for eventual legal complications. When asked *why* this omission, most managers in charge of the programs replied: "Our legal people take care of that kind of thing. And besides, we're not doing anything outside the law." Or "our legal people have informed us that so far there has not been a precedent-setting decision concerning any of the laws designed to regulate business influence in politics and government."

What is the real complexion of the legal picture?

Several weeks ago FACTORY eavesdropped on a round-table discussion on this subject among prominent legal minds. Present were corporation lawyers, a political committee counsel, and a federal attorney.

Here's what went on that you should know about:

The main body of laws regulating political activity by industry are contained in the Federal Corrupt Practices Act of 1925 (extended by Taft-Hartley to affect the political actions of labor).

In addition, there is increasing concern over the statutes called the "conflict of interest" laws.

There has never been a case adjudicated by the courts covering management violation of either body of laws. The old CIO and the UAW, however, were involved in charges in 1948 and 1957, respectively. The first case, concerning a statement of support for a particular Congressional candidate carried in a union-financed publication, was thrown out for not falling within the FCP statute. The second involved paid endorsements of candidates on local radio and television. The defendant UAW was acquitted by a lower court jury.

If a company supports an employee running for office by retaining him on full salary, the majority opinion of the legal gathering was that this may be a "technical" violation, but is safe from investigation as long as support does not involve use of company offices and personnel for the campaign. If elected, this same employee is *not* restricted by law from retaining full salary and benefits. Only *appointed* government officials must sever company ties upon taking office.

Care must be taken to provide equal compensation treatment to hourly employees if it's not already provided in union contract.

When a company chooses to support or oppose issues before a legislature, it should be concerned chiefly with whether the issue is to be voted on. If it is, federal and state restrictions are rigidly against contribution of money or facilities. If an issue is not to be voted on, the law tends to be more flexible—the federal law allows contributions, office space, and internal and external communications about the issue.

In some cases, state laws affecting corporate political activity are considerably more strict or more lenient. The legal minds suggested that before taking the step into the arena *state regulations must be consulted.*

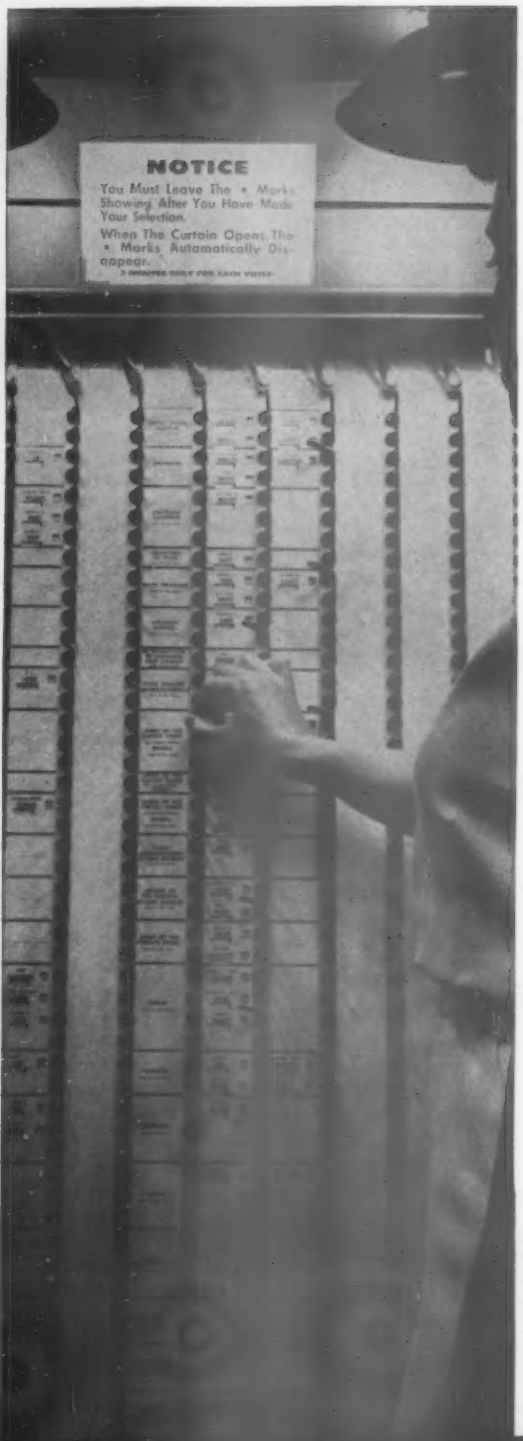
An indication as to why most companies start political programs with one of the education packages is found in this majority opinion: Any company can underwrite the cost of a non-partisan political education program without violating a statute.

The only hitch in this interpretation, which seems to be overlooked by most companies, is this:

Any political education program connected by time or design with an election may be suspect—and subject to court action.

Turn the page

. . . SHOULD YOU PLANT MANAGEMENT PLAY THE GAME OF POLITICS?


NOTICE
You Must Leave The x Marks Showing After You Have Made Your Selection.
When The Curtain Opens The x Marks Automatically Disappear.

Labor, as an institution, is affected by the same body of laws covering activities of management in politics. But labor participation is shrouded in a protective fog of "personal, voluntary contributions and action."

Our conclusion as the round table droned on: The reason most political activity programs are constructed around the individual is that he is not affected by the rules governing the affairs of corporations. He is then a business spokesman *protected by law* as an individual.

Whatever *you* think of this gray area of law, one thing is certain:

Before embarking on a program of political activity, regardless of intensity, consult your legal adviser and prepare for any eventuality. Include this preparation in your written statement of policy.

SIX CRITICAL QUESTIONS

You've seen the plant management political arena, its physical make-up, and a few of the contenders already on the scene.

What are the critical questions they must answer before going on? They're questions *you* must answer, too.

Critical Question No. 1

Is the political action movement just another management fad?

Mauro Checchio feels this way:

"To even suggest that political activity by management is a fad is bunk. Unless we take a hand in city politics and government these same cities will soon become economic "ghost towns."

AIM's John Hamilton reflects his organization's party line when he says:

"The move to get management men into politics as individuals will fade. This should be a natural part of a man's life anyway. Company participation will increase. It's our constitutional right to extend influence. And to influence issues is a critical point of industry survival."

Tom Reid of Ford speaks in terms of critical dates:

"Judging from the activity I know is going on behind the scenes, that is, without benefit of publicity, I'd say the move is definitely here to stay. We do, however, have a critical date to get over—November, 1960. Many managers may feel the need for political activity has vanished when election time is over."

Critical Question No. 2

If a company does decide to enter the political arena, should its encouragement of management people be informal, or should it initiate a formal policy?

Opinion is almost unanimous among the men interviewed. They favor a formal program.

The most popular reason for this answer: "If you're going to have a program and expect your employees to develop confidence in your sincerity, they should have written rules for action and indications of approval.

Subby Urso was the lone dissenter. He feels written policy announcements may tend to give the impression of a planned attack on government.

MOMENT OF TRUTH COMES for every party worker, when voter closes curtain, confronts ballot. Grass-roots approach of political activity programs is to promote thoughtful flip of switch. (Black Star Photo)

Critical Question No. 3

Should political success by management personnel be included in over-all performance evaluations?

The men at the helm of Ford's Civic and Governmental Affairs Office say no—with this comment:

"Success in politics should not carry any more weight than success in any other civic activity. Any action like that would be tantamount to endorsing an individual's participation as an agent of the company. However, management must indicate subtly that because it looks with favor on such activity an individual will be in better stead if he's successful at it."

Messrs. Checchio, Urso, and Hamilton feel that, all things being equal between two managers up for promotion, the one with an outstanding civic and political record should be given the nod. Says Checchio:

"A man is hard put not to become a more complete man *or manager* after an adventure into politics."

Critical Question No. 4

What should company policy be regarding pay and time off while pursuing a political career?

Here, all but the Ford people believe "a man should not be financially penalized for carrying management skills into government." They agree the least compensation allowed should be the difference between salary as a public official and managerial pay. (Mr. Inside receives no pay for party work; Mr. Outside draws $1000 yearly salary as committeeman.) Most companies, program or not, allow time off with pay, within reason, to fulfill political obligations. (Within reason is construed here as meaning up to about five consecutive days, depending on importance of the management function.)

At Ford, oddly enough, there is no "time off with pay" clause in its well-planned program. It's understood that a salaried person who becomes a full-time elected official is allowed one year's leave of absence, without pay, but with full seniority rights. At the end of the year the politico-manager returns briefly to the Ford home office to compare notes and try to indicate direction—either back to the company after his term is ended or to a continued political career. This, according to Tom Reid, gives Ford a chance to plan for the wandering son's return and to arrange new job responsibilities.

Hidden in Ford's apparently progressive plan is the seed to a fifth critical question.

Critical Question No. 5

How do you get a wandering manager back into his industrial job once he decides the political lark is over?

There is agreement here also, summed up this way:

Any manager who makes a go of politics will certainly be a better man for the experience and therefore will be prepared to assume even greater responsibility upon his return. So the task of working him back in is easy—just give him a bigger job to do than he had before leaving to enter politics.

Critical Question No. 6

Is there any way to indicate to management people just what they'll find in the political arena once they've decided to give it a try? (Inspiration for this question comes from professional political leaders like Republican National Committee Chairman Thruston Morton. He expresses concern over the number of men who, because of assignment to menial tasks, leave the party workshop soon after joining up.)

Aside from trying to convince managers they're doing a vital public service, our sources suggest these tactics: . . . Make it clear that when he first enters politics a manager is as new as when he first started in business. He'll have to start at the bottom and work his way up. Impress upon him that to work behind the scenes is as vital, if not more so, as being a table-thumping orator. . . . At Ford, frustrated managers who must be the "top dog," no matter what, are urged to form political clubs. As club captains they can recruit their own members, formulate policies and, when strong enough, ask to be recognized by the local political machine.

. . . If all else fails, Tom Reid suggests:

"For the desk-bound manager there's no greater tonic than after-hours' participation in the exciting, glamorous, rewarding game of politics."

LAST LOOK AT THE ARENA

Through all the optimism extended by those already playing the game of politics, sounds from the opposition can be heard. In the main, however, counter-arguments presented by the optimists quickly dispel the gloom of opposition.

In answer to the fear that announcement of a program encouraging political action would create ill-will among buyers and stockholders, Tom Reid of Ford says this:

"Quite frankly, we had real apprehensions about the repercussions of our actions. We were afraid of losing customers, offending stockholders. But, since announcing the program the unsolicited response from both groups has been gratifying."

Certainly, there's no arguing the fact that government is playing a more influential role in the administration of industry affairs. (Witness the recent steel settlement.) The tax influence alone is enough to warrant some kind of action. But there's also increasing federal spending on privately supplied goods and services and welfare programs. Since industry is the foundation of our economy, every citizen, regardless of party leanings and labor-management affiliation, has a stake in government.

The argument presented by a few personnel specialists that a manager is being paid to be a manager, and not a politician, is evasive—since most local political activity is part-time and should not interfere with his job.

Others have argued that the corporation has no right to interfere with the personal lives of its employees. Therefore, only informal recognition should be afforded successful politico-managers.

This argument is without rationale, since to educate, inform, and encourage non-partisan political activity is not interference or coercion. It is merely providing the stimulation and wherewithal for pursuing civic responsibility that is an individual's right and heritage as an American citizen.

In short, the political action program should become as integrated a part of the management complex as industrial relations, accounting, and maintenance. Only this way will management skills realize their ultimate reward and fulfillment.

WHAT DOES THE POLITICO-MANAGER LOOK LIKE? FOR A PHOTO-ESSAY ON CHECCHIO AND URSO . . . TURN THE PAGE

... SHOULD YOU PLANT MANAGEMENT PLAY THE GAME OF POLITICS?

PORTRAIT OF A POLITICIAN

When Mauro Checchio left the University of Iowa 11 years ago, with a degree in psychology and commerce under his arm, he made up his mind to get ahead fast.

Watching Checchio wheel through a typical work day, you know he's done just that.

"When and how did you add politics to your list of activities?" we asked him.

"When I returned to live in my home town a few years ago, it was like local boy makes good . . . I'm Italian and Catholic, a good thing here. I was a natural candidate for the committee. What's more, the town has always had tremendous stability because of business activity in politics."

"Your success in politics must be founded on something," we prodded.

"My platform is simple. I just tell the people that when they demand more services, they automatically demand a higher tax rate, because these services don't come from God, you know."

AT THE PLANT (Personal Products Milltown, N. J., headquarters), politico-manager Checchio checks packaging operations (above, left) with new Plant Manager Sutherland and Production Foreman McGrain (white shirt). Later, he stops to chat with a machine operator who remembers Checchio when he was manager of a ½-million-sq.-ft. plant.

AT HOME, he takes time out for family sing with wife Portia and children. "There's no need for business or politics to interfere drastically with home life," says Checchio.

AT A TOWN MEETING, ex-labor negotiator Checchio huddles in caucus room (above) with other town committeemen before heading for public chamber. Though solidly GOP, the group still exercises intricate backroom party gymnastics before going out to publicly vote on issues. At the public hearing (below, left) Scotch Plains Acting Mayor Checchio (committee government allows each member to act as mayor for one year) pleads his case for higher budget. Later, he engages local newsman (below, right) and drives home a point that should make the newspapers the next day.

... SHOULD YOU PLANT MANAGEMENT PLAY THE GAME OF POLITICS?

PORTRAIT OF A POLITICIAN

Sebastian, "Subby," Urso readily admits the thing he values most about his political career is a four-year appointment to the board of trustees of the Connecticut School for Boys.

Rarely is a behind-the-scenes party worker afforded such an honor. As one state senator put it: "I have been impressed with your deep desire for civic improvement and good government."

After working and having fun rallying voters to the polls every election day for the last 12 years, Subby says:

"The way things are set up today, election-day weather is a toss-up. Usually the guy with the most cars gets the vote. Let's change election day to a balmy day in September—we'll get a record turnout each year."

Thoughtful, retiring Urso has no aspirations toward public office. Thinks the most rewarding political job is the one that gives an election a better chance to work.

Photography for this section by Joe Ruskin, McGraw-Hill staff.

AS A MANAGER, production supervisor Urso makes daily check of operations at Royal McBee's Hartford (Conn.) typewriter ribbon plant. A self-made man whose formal education stopped at high school when the depression hit his family, Urso came up the management ladder from "straw boss." He's now number two man in a 160-man plant.

AS A FATHER, he finds great satisfaction being welcomed home every night and relaxing with his family in the home he bought with his "own money" and remodeled with his "own hands."

AS A PARTY ORGANIZER, politico-manager Urso meets weekly with his chieftains at Third District Democratic headquarters (above). With him this night (to his right) is State Senator Anthony J. Armentano, whom Urso is pushing for nomination to Lt. Governor. Later, Urso charts the party plan of attack on voters (below, left) then briefs his campaign assistants on heart of push strategy (below, right). Says one state house official of Urso's role in politics: "It is unfortunate that we do not have a greater number of electors who have (his) enthusiasm to achieve a better Connecticut."

Get more for your equipment dollar—watch

What's Ahead in MACHINE TOOLS

Do more, do it faster, and do it more reliably. These seem to be the commands plant management has issued to the machine tool builders. Or such was the conclusion drawn by FACTORY *editors who attended the 24th Machine Tool Forum in Pittsburgh last month. Sponsored by Westinghouse Electric Corporation, the Forum lived up to its reputation for recording the pace and problems of production tool developments. To aid you in planning for better selection and utilization of your machine equipment, we suggest you watch these 11 trends projected at this year's Forum.*

1. Wider use of electrolytic machining for production parts

Electrolytic machining (essentially a deplating process using an electrode "tool" and an electrolytic fluid) will find new fields in the machining of production parts, especially with those materials that are tough, stringy, or temperature-sensitive. Examples include edges and tips of blades, stainless steel honeycomb sections, and hypodermic needles. The method eliminates burr and layover. The entire process is unusually fast, is conducted cold, and generates no spark or arcs. Disadvantages lie principally in the special problems that are involved in handling the electrolytic solution.

2. More use of electric discharge for difficult machining jobs

This technique (metal removal is done by a spark jumping through a dielectric medium) is especially suitable for the machining of forged dies and molds where the lot quantities are greater than three. A wide range in size is now permissible—from tiny items to those large enough to blank refrigerator doors. Advantages result from inexpensive die alterations, the ability to produce complex dies with less skill, and the ability to work to part print tolerance—not punch tolerance. Electric discharge machining is a slow process, best applied where faster methods are not acceptable. However, heat treating, straightening, and annealing prior to machining operations can be eliminated.

3. Increased demand for faster, automatic tool and die changes

Best example is the quick-change die stamping press. Danly Machine Specialties, Inc. (Chicago), offers a pushbutton change of heavy dies that cuts the number of operations from 17 to 11, reduces time from four hours with six men and a crane operator to eight minutes with one man at the master controls. Another benefit is reduction in overruns and in the floor space needed to store them.

4. Better integration between the tool and its electrical control

Much of the difficulty in producing reliable or continuous positioning of machine tools is the failure of machine tool builders and control manufacturers to design mutually complementary systems. One of the more promising solutions to the problem seems to lie in the introduction of digital (counting) techniques for positioning. These match the digital techniques widely accepted as superior for processing the

input (or command) data to the machine. Up until now most positioning devices used analog (comparison) techniques. A basic advantage of the digital system is that it will give an unaltered "yes" or "no" decision concerning position—regardless of the speed of the tool approach. This feature eliminates both the danger of overshooting and the problem of time-consuming hunting.

5. Faster operator "break-in" for complex machines

Leonard Hesse, electrical engineer for Gisholt Machine Company, Madison, Wis., claims that for a tape-programed turret lathe "operators with lesser experience and skill can be used." Specifically, he points out, in today's new machines spindle speed and feed rate selection are automatic; set-up time beyond tool setting is eliminated; machining time per part and per lot is reduced; cycle time is independent of operator fatigue or care with which feed rate cams are positioned.

6. Greater emphasis on reduction of vibration and sound

R. B. Edminston, senior engineer, Westinghouse, Buffalo, ticked off these major reasons for the new emphasis: (1) Demands for greater precision, improved surface finishes, and geometric shapes. (2) Interference with speech and concentration. (3) Increased legislative pressure for workmen's compensation for loss of hearing. (Many manufacturers, reports Edminston, are including "noise specifications" in their purchase orders.) (4) Local ordinances aimed at industrial nuisances.

7. Greater interest in electrohydraulic "shock" forming

This technique works hard-to-form metals by means of an electrical discharge in a fluid medium. Similar in principle to explosion forming, electrohydraulic forming stores energy at a comparatively slow rate in a bank of capacitors, then suddenly discharges it through a gap in a water bath. This creates a shock wave that moves the metal against a female die face to produce the desired shape.

8. More specialized machining jobs for ceramic tools

They will continue to be most successful in finishing cast iron, steel, aluminum. Poorest performance will be in machining aluminum alloys of high silicon content. Single ceramic cutting points (for turning) will be more satisfactory than multiple cutting heads (for milling) due to inherent brittleness of ceramic tools. Cutting speeds should be high and machine relatively vibration-free. Where speeds are low and heat resistance is not a factor, ceramic tooling will make slower impact.

9. Higher capacity control devices in smaller spaces

Westinghouse itself offers two convincing examples of this. Its "BF" 300-volt 6-amp. control relay modules now do the work of the old-style 600-volt 10-amp. units. This cuts panel space by more than 50%, takes up less floor space, less machine space, and reduces prices by 20%. A similar trend is evident in circuit breaker designs offering larger interrupting capacities in smaller space.

10. Pressure for more attractive control panel design

Users are asking for more durable buttons, more attractive styling, greater flexibility for circuit designers, and safety features, such as flush mountings without projections. One conference participant, however, voiced the opinion of many maintenance managers: "We want ease of maintenance and accessibility, not aesthetics. As soon as we run into trouble, we remove the fancy hood anyway."

11. New maintenance problems from more electronic controls

L. C. Michelson, a Westinghouse chief engineer, comments on effects of electronic controls on machine tool maintenance: (1) Machine tool users are beginning to expect a two-year guarantee for electronic systems. (2) How many spare parts (for expensive packaged components) must the user stock? (3) Who will provide or train service personnel—the machine tool builder or the electrical manufacturer? (4) How will the various electronic diagrams (for each part of the package) be unified into a single integrated schematic circuit that a maintenance man can work from?

PAY RATES FOR KEY INDIRECT JOBS—IN 9 CITIES

All figures are average straight-time earnings in manufacturing industries except figures with asterisk, which are for **all** industries. They include incentive pay, if any, but **not** overtime, weekend holiday, or night-shift premium.

Weekly earnings are average salaries for standard work week.

	DAYTON DEC. '59	DENVER DEC. '59	FORT WORTH NOV. '59	JACKSONVILLE DEC. '59	MINNEAPOLIS-ST. PAUL JAN. '60	PHILADELPHIA NOV. '59	PITTSBURGH DEC. '59	PORTLAND (MAINE) NOV. '59	SAN BERNARDINO NOV. '59
MALE JOBS, EXCEPT WHERE OTHERWISE SHOWN									
MAINTENANCE AND POWERPLANT: Average straight-time hourly earnings									
Carpenters, maintenance	$2.97	$2.74	$2.61	$2.28*	$2.76	$2.75	$2.84	$2.07*	$2.75
Electricians, maintenance	3.02	2.77	2.88	2.68	2.93	2.82	3.01	2.23	3.00
Engineers, stationary	2.90	2.74	2.82	2.22*	2.70	2.55	2.86	2.08*	2.86*
Firemen, stationary boiler	2.52	2.34	——	1.98	2.52	2.37	2.65	1.74	2.54
Helpers, trades, maintenance	2.29	2.04	1.78	1.88	2.31	2.42	2.48	1.85*	2.36*
Machinists, maintenance	3.07	2.69	2.81	2.64	2.96	2.81	3.07	——	2.99
Mechanics, automotive, maintenance	2.77	2.71	2.10	2.01	2.61	2.63	2.88	2.02	2.91
Mechanics, maintenance	2.96	2.66	2.27	2.07	2.55	2.68	2.90	2.08	2.88
Millwrights	——	——	2.44	2.65	2.83	2.74	3.00	——	——
Oilers	2.39	2.26	2.14	——	2.35	2.07	2.52	——	2.33
Painters, maintenance	2.88	2.80	2.52	2.12*	2.79	2.66	2.69	1.84*	2.65
Pipefitters, Maintenance	——	2.79	——	2.74*	2.95	2.87	2.87	——	2.84
Sheet-metal workers, maintenance	——	2.75*	——	——	——	2.76	2.90	——	——
Tool and die makers	3.32	2.88	3.00	——	3.03	3.04	3.16	——	——
CUSTODIAL AND MATERIAL MOVEMENT: Average straight-time hourly earnings									
Guards	——	2.27	2.33	1.67	2.20	2.17	2.43	——	2.38
Janitors, porters, and cleaners	2.06	1.89	1.77	1.46	1.94	1.87	2.08	1.73	1.98
Janitors, porters, and cleaners (women)	2.00	1.70	1.04*	.96*	1.62	1.60	1.83	1.20*	——
Laborers, material handling	2.17	2.09	1.78	1.27	2.14	2.06	2.21	1.67	2.05
Order fillers	2.14	2.09	1.67	1.58*	2.07	2.01	2.22	1.85	2.18
Packers, shipping	2.23	1.90	1.79	1.38	2.08	1.89	——	1.78*	2.26
Packers, shipping (women)	1.65*	1.57*	——	——	1.63*	1.53	——	——	——
Shipping clerks	2.36	2.14	2.04	1.76	2.41	2.26	2.48	1.86	——
Shipping and receiving clerks	2.27*	2.20	2.08*	2.04*	2.36	2.16	2.46	1.87	2.42*
Truckdrivers, light (under 1½ tons)	2.13	1.93	1.46	1.27*	2.59	2.41	2.64	1.90*	1.95*
Truckdrivers, medium (1½ to and including 4 tons)	2.18	2.26	1.90	1.48	2.54	2.58	2.85	1.80	1.98
Truckers, power (forklift)	——	2.14	2.01	1.71	2.24	2.17	2.37	1.86*	2.32
Truckers, power (other than forklift)	2.22	——	——	——	2.31	2.07	2.72	——	2.42*
Watchmen	1.66	1.64	1.19	1.40	1.85	1.84	1.99	1.47*	——
FEMALE JOBS, EXCEPT WHERE OTHERWISE SHOWN									
OFFICE, PROFESSIONAL AND TECHNICAL: Average straight-time weekly earnings									
Comptometer operators	84.50	69.00	68.50	60.00*	74.00	70.00	77.00	65.50*	——
Draftsmen, senior (men)	126.50	114.00	101.00	106.00*	109.50	112.00	134.50	——	140.50
Draftsmen, junior (men)	105.50	82.00	75.50	80.00*	87.00	89.00	99.50	——	101.00
Duplicating-machine operators	69.00	——	59.50*	——	59.00*	64.50	71.50	——	——
Key-punch operators	74.00	71.50	72.50	59.50*	61.50	67.00	78.50	61.50*	80.00
Nurses, industrial (registered)	93.00	85.00*	103.00*	——	88.00	90.00	99.00	77.00*	99.00
Office girls	55.00*	50.50*	57.00	49.50*	48.00	51.00	58.00	——	——
Payroll clerks	——	75.00	68.00	71.00*	70.50	70.00	86.50	——	73.00
Secretaries	87.50	86.50	79.50	76.00	80.00	89.00	94.00	76.00	92.00
Stenographers, general	92.50	75.50	75.00	66.50	66.00	70.50	79.50	66.00	82.50
Typists, class A	82.00	70.50	71.50	54.00	63.00	72.00	77.50	58.00*	74.00
Typists, class B	67.50	59.00	49.00	52.50	56.50	59.00	67.50	48.50*	69.50

Indirect Labor Pay Checks Spiral Upward

Election-year politicians will have plenty to say about inflation—with many calling it a diminishing peril. But these latest statistics from the U.S. Department of Labor's Bureau of Labor Statistics show that labor costs, at least, are still spiraling.

This is the second of FACTORY's exclusive reports this year (see April issue, page 110) showing indirect labor costs in nine representative cities. It can help you compare your wages with the going rate. Or it can give you an accurate idea of the wage scales across the country if you're thinking of moving or opening a new plant.

D. C. Bell, plant manager, Remington Rand, Univac Div., St. Paul— "These [new tools] make it possible to effectively *engineer* a plant layout. Even veteran engineers are misled if they depend on experience alone."

H. I. Danner, layout engineer, Martin Company, Waterton, Col.— "They answer layout questions better than intuitive assumptions. I'm going to train others to use these new tools."

R. D. Foster, chief engineer, Red Dot Foods, Madison, Wis.— "Learning these new techniques has reopened my approach to layout problems. I'm coming out of a rut, one that hasn't been bad, understand, but still not good. I'm especially interested in the MAG Count."

S. S. Gray, assistant vice president, Union Wire Rope Corporation, Kansas City, Mo.— "New techniques and new approaches to plant layout are needed to develop new ideas in familiar surroundings."

R. D. Richter, chief industrial engineer, Black, Sivalls & Bryson, Kansas City, Mo.— "How well we adapt layout to product changes influences costs quite a bit. For us, the P. Q. and REL Charts will be especially useful, will really help us do a better job."

V. G. Schaffer, assistant to the president, Magnetrol Inc., Chicago.— "We're a small company without a layout specialist. Knowing tools like these exist is a great help in planning."

3 NEW TOOLS FOR BETTER PLANT LAYOUT

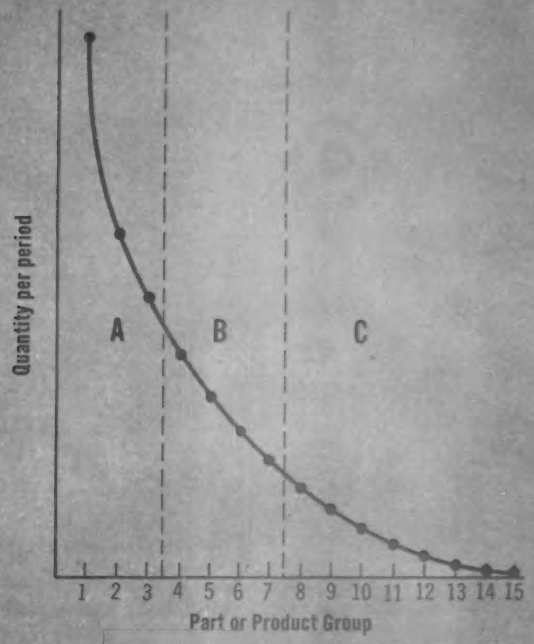
Really new plant layout techniques don't come along every day. When three emerge at once, it's news. Good news, that is, for managers (like the six at the left) who have to wrestle with the problems of material flow and plant arrangement.

Each of the men attended a recent course on plant layout and facilities planning, conducted by Richard Muther (author of "Practical Plant Layout," McGraw-Hill Book Company, Inc., 1955) and Associates, consulting engineers of Kansas City, Mo. The University of Kansas Extension Center sponsors this annual work course. FACTORY's *managing editor, Robert S. Rice, was there too. In this article, he reports what he saw and learned about three new plant layout techniques.*

Turn the page

For Better Plant Layout...

TOOL NO. 1



P. Q. CHART Tells what production techniques to use in plant layout.

TOOL NO. 2

FACTOR	−3	−2	−1	0
B BULKINESS OR DENSITY		Very light and empty (bulky sheet metal).	Light and fairly bulky.	Base — reasonably solid (block of any wood).
C SHAPE	Highly flat and stackable or fully nestable (flat sheets).	Readily stackable or nestable (pad of paper, soup bowls).	Partially nestable.	Basically round or square.
D RISK OF DAMAGE		Not susceptible at all (scrap iron).	Susceptible to practically no damage (castings).	Not susceptible to much damage (measured and cut wood).
E CONDITION				Clean and firm.

MAG COUNT Tells where to locate materials and equipment in new plant layout.

TOOL NO. 1 — P. Q. CHART

The P. Q. (product-quantity) chart tells you what approach to use in planning a new layout, whether it's straight-line assembly, job shop, or a combination.

Here's the way to make a P. Q. chart:

- Classify all parts or products made in your plant and compile them into groups of similar items. For example: gears, shafts, valves, motors.
- Assign normal production quantity per year (or month) for each variety of part or product.
- Arrange the part or product counts in order of decreasing quantities. Plot the results on a graph like the example above.

Use production-line techniques to plan layouts for parts and products on the high-quantity part of the curve (area A in illustration). Items on the low-quantity, flat part of the curve are the true job-shop products. Process layout is usually best for fabrication and treating. Fixed-position layout is usually best for assembly.

For the best layout for items in Area B, use modified production-line techniques, with process departments lined up for best flow pattern or product-group production. If your P. Q. curve comes out shallow—almost horizontal—a single type of layout is most practical and a plant-wide material-handling system most effective. If the P. Q. curve is deep (see example), two or three different types of layout and handling systems usually provide best over-all costs.

The P. Q. curve is also a guide to your most helpful type of flow analysis. In the curve above, an operation process chart is the right layout planning tool for Area A. In the higher-quantity portion of Area B, a multi-product process chart will help point the way to production-line economies. For the rest of Area B, you'll probably want to group similar parts, products, or processes.

For Area C items, the best way to chart flow data is on a "from-to" or cross-chart basis. This plots the movement of all items between plant processes. You'll make the best compromise in layout if you weigh it toward the paths of heaviest traffic.

PQRST analysis—It's easy to get so wrapped up in the arrangement of production equipment that you neglect other important layout factors. To achieve a layout that best satisfies all conditions, you need to mind your R-S-T's (routing, support, time) as well as your P's and Q's. Here's a complete checklist for layout analysis. It considers PQRST (product, quantity, routing, support, time). Before you approve a layout, be sure it answers these questions:

P. Does the layout accommodate all the products it must process?

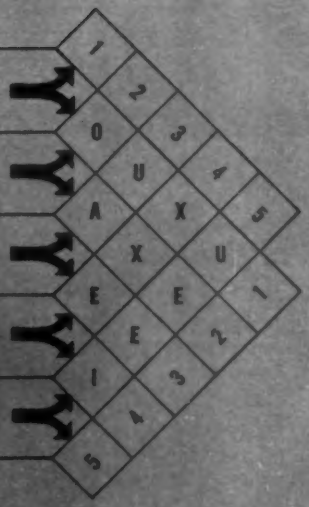
Q. How many of each product will be processed during low, average, and peak loads?

+1	+2	+3	+4
Fairly heavy & dense (cored castings).	Heavy & dense (solid castings & forgings).	Very heavy and dense (die block, lead).	
Oval, rectangular, or elongated.	Long and slim (tubes, short bars).	Long, slim and curved, or extra long.	Extra long and curved or especially long.
Susceptible to some damage by crushing, breaking, or scratching.	Very susceptible to some. Susceptible to much damage.	Highly susceptible to some or susceptible to damage (glass).	Highly susceptible to very much damage (acid in glass, explosive).
Oily or flimsy. Awkward to handle.	Covered with grease, slippery, very awkward to handle.		

TOOL NO. 3

OPERATIONS:

1. BLANK
2. FORM
3. WASH
4. PAINT AND DRY
5. STORAGE



IMPORTANCE CODE

A	Absolutely essential	O	Ordinary closeness
E	Especially important	U	Unimportant
I	Important	X	Undesirable

REL CHART — Tells how far apart from one another plant operations should be in layout.

R. What operations are performed, and in what sequence for all products?

S. Do supporting services—storage area, maintenance shops, and offices—fit into the layout scheme?

T. How long does it take to perform each operation on a product? What are the normal operating hours, shifts, vacation shutdowns? How long will it take to plan and install the layout? How far into the future will the layout be effective?

TOOL NO. 2 — MAG COUNT

MAG count measures the MAGnitude of material movement in a plant. It helps determine methods and machine locations that will minimize handling costs. The larger the MAG count, the more critical the handling problem. Generally, layouts should first satisfy materials and parts with largest MAG counts.

One MAG is the equivalent of a piece of material, reasonably solid and compact, clean and firm, not susceptible to much damage in handling, and of a size that may be held conveniently in one hand. For example, a 3-in. cube of dry wood is equal to 1 MAG. If you have 10 pieces and can hold them all in one hand, each piece has a value of 1/10 MAG.

To calculate MAG count (above, center), you must modify the size count (A) by several other factors that affect the magnitude of handling. They are: bulk or density (B); shape (C); risk of damage, breakage, or contamination (D); condition (E).

MAG count is flexible. Each plant may define its own MAG to fit its materials and products, set up its own modifying factors. Here's how it works:

MAG count = Size count + (size count × net sum of factors)

$$\text{MAG} = \text{A} + \text{A}\left(\frac{\text{B} + \text{C} + \text{D} + \text{E}}{\text{N}}\right)$$

(N = number of factors used)

One final caution: The MAG count of a part will change if an operation changes the size, shape, or condition of the part significantly.

TOOL NO. 3 — REL CHART

This type of chart has been used before to show relationships of operations. But its use to rate the relative importance of relationships is new.

To make a RELationship chart (above, right), list activities in the vertical column. Production operations come first, services follow. Next determine importance of having each combination of operations close to one another, and the major reason for this decision. Then just enter code letter for importance of closeness in the top half of the intersecting diamond, and code number for the reason in the lower half. Now you can go to work.

PRODUCTIVITY: A VICTIM OF NATIONAL APATHY

An Editorial Commentary

BY ROBERT S. RICE
MANAGING EDITOR, FACTORY

For 17 years before his 1950 arrival on the staff of FACTORY, Bob Rice held industrial management positions in several manufacturing areas. He spent the last seven of those years as Chief Industrial Engineer at United States Steel's Clairton, Pa., works.

Compared with other world powers, the U.S. rate of productivity *improvement* is among the lowest. It's around 3%. West Germany, for example, is boosting output per man-hour more than 4%. Russia's rate is supposedly twice ours (7.4% in 1959). To these statistics many of us have said "So what! Other countries have more room for improvement than we have. They're just trying to catch up with us in productivity and production efficiency." This kind of thinking is evasive and dangerous to our national well-being.

Talk about the threat of foreign competition grows daily. Two weeks ago I visited a Chicago plant. On a bulletin board the front page of a union's newspaper screamed the threat of Japan's TV industry. The story didn't suggest that our industry cut profits or costs. It talked of the differences in wages and working conditions.

Lower average hourly labor rate helps foreign competitors set down on our shores comparable products at lower prices. But it doesn't account for their improvement in productivity—in output per man-hour. Talk with production men who've been East or West. They'll tell you, as they have told me, that they saw many highly mechanized plants with high output rates. This is an aspect of foreign competition we are aware of, but don't think about and discuss enough.

Question is: Can we do better? Certainly we can. We know how to produce better than we're doing. Manufacturing technology *is* far ahead of manufacturing practice.

What's holding us back? There are several hurdles:

• Concern for employee objections. "The union would shut us down if we tried to do that." "What would we do with the people we wouldn't need if we installed this idea? The clamor over such issues as unemployment and featherbedding makes this a particularly sticky area. The problem of handling people displaced by new equipment and techniques (in a local situation) is fraught with argument and delay, even when national statistics show high employment opportunity. There is a critical need for better methods of handling these problems locally—with understanding, cooperation, and promptness.

• Want of money. "It's a good idea, but we can't get the money to buy the equipment." Today's best ideas designed to increase productivity usually cost money to install because they require new equipment. Generally, capital funds are limited. Here, more astute comparison and selection of alternative improvements would, in the long run, provide more new equipment by increasing the average return on capital investments. More aid to money-starved plants would come from reform of depreciation and tax rules.

• Lack of broad knowledge. Most production men I've talked with are hep to technological developments in their industries. But too many have not heard of methods and techniques that are as little as five years old. Many techniques have multi-industry application potential. Just knowing what *your* industry is doing isn't enough today. Broader knowledge of technological developments and organized imagination to appraise them is needed.

• Day-to-day problems. "I've got 10 critically late orders, a grievance to answer, two foremen off sick. Come back some Tuesday." Too often, unless the need for improvement of a process is on the critical list, it has to wait until the "fires" are put out. Meanwhile, capital funds are diluted. Productivity gains are delayed.

You can increase productivity in your plant if you'll give some thought to how you can take the hurdles faster. Remember, labor costs are a result of output per hour as well as wage rates. You can't take a direct hand in raising the wages of competitors. But you *can* do something about your own output per hour.

A

FACTORY

ENGINEERING AND TECHNOLOGY REPORT

SCRAP RECOVERY

NO. 5

THIS IS WASTE. Product of errors—much of it could have been recovered.

THIS IS SCRAP. Believe it or not, the metal chassis for the sleek air filter above is made from bottle cap scrap.

SCRAP RECOVERY—Profitable Practice

Is MUNGO biting into your plant's scrap recovery dollar? Most plant managers don't know. In fact, most plant managers don't know what MUNGO is. It's a scrap dealer's term for management mistakes. It's used to describe valuable materials that someone threw away—or even paid to have hauled away. Managers make millions of dollars worth of mungo mistakes each year. Proof: Scavengers at New York City dumps paid the City $33,000 in 1959, just for the license to pick mungo out of the dump's industrial waste piles.

To reduce management mungo mistakes in scrap recovery, FACTORY asked the advice of plant managers, scrap dealers, disposal experts, and equipment manufacturers. Their advice: To get the maximum return from a plant's scrap, managers should know and practice three basic principles in their scrap recovery program. These are the three:

1. Know the scrap market—It makes sense to know the products, prices, and customers for scrap. Sometimes a scrap dealer is a plant's best customer. Sometimes a plant can be its own best customer.

2. Keep scrap clean—This includes keeping dirt and rubbish out, removing (and re-using) oil, segregating or separating classes of scrap.

3. Handle scrap efficiently—If a plant expects to capitalize on its scrap, it should devote as much handling attention to the scrap as it does to production materials.

Valuable scrap takes many forms. For example, it may include glass, brickdust, plastics, and even water. Scrap goes many places. Not just to the dealer, but to other factories, smelters, refiners, and even to other departments in the originating factory. Here are three examples to stimulate imaginative scrap recovery programs in manufacturing plants:

EXAMPLE 1. Sperry Electronic Tube Division (of Sperry Rand Corporation) in Gainesville, Fla., has a neat trick for recovering "scrap" water. It starts out with raw water of high solids content. The plant treats the water to reduce the solids, and this purified water is used to rinse the electronic components manufactured. However, after the water has done its rinse job, it still contains less solids than the raw water contained before purification. So, though it is now a waste water, it is still cheaper to reprocess it than to dump it and start from scratch.

Editorial research directed by Mervin F. Roberts, Associate Editor, FACTORY

EXAMPLE 2. In the ceramics industry, broken or defective tile is usually carted away and used for fill. To make sand-finished brick, most companies purchase sand and dust it on the brick. Not Metropolitan Brick Company at Canton, Ohio. This plant grinds its rejected tile to the particle size of sand, and the ground material is dusted on the raw brick. Results: controlled color of "sand," better adherence to the brick.

EXAMPLE 3. In scrap recovery the slickest trick is to create a new product out of the worthless scrap. This means, for example, that melting or reforming might be avoided. The large picture at left is one example. Disks are punched from rectangular tinplate to form bottle crowns. The skeleton could be scrap worth about $10 a ton. But Mundet Cork Company, in its North Bergen (N.J.) plant, carefully spaces the punched-out crowns about ⅛ inch apart, and saves the perforated tinplate. Most of it is not sold as scrap but as a by-product. The ultimate use: to hold the filtering agent in air filters. The fact that the product is tinplated, painted, and clean enhances its value for use as the "chassis" of the filter.

It pays management to know the scrap market

In most scrap marketing, the material winds up in a melting operation. How it gets there is a story worth knowing. Worth knowing in terms of cold hard cash, because scrap is big business. Fifty-five years ago the junkman became a waste material dealer. On June 1, 1960, the National Association of Waste Material Dealers became the National Association of Secondary Material Industries (NASMI). Dealers have a $4½-billion stake in industry. They are experts in their field.

FACTORY visited one of them, Mr. Norman Weltmann, at Marley's Inc., Syracuse, N. Y. This dealer buys obsolescence scrap, new scrap, solder dross, turnings, borings, plastics—in short, all of a plant's secondary output except waste. He buys the entire scrap package—even the marginal items. Marley's often has an agreement with the factory that the price during one month for each class of materials will be the published market price for the first day of that month. It balances out. Says Weltmann: "Service is the real backbone of the scrap business." In several of the plants he services, he owns the scrap containers, so the plant's capital investment is minimized. The dealer helps with plant housekeeping. He moves scrap promptly, helps the plant improve its insurance status. Also, Marley's has developed a transmittal system that reduces invoice handling.

One suggestion that will save money: Call the dealer when planning a structural change in the plant. Often one extra inch of clearance under a machine will make a big difference in the cost of handling scrap material.

Plants with high scrap volume, using just one raw material source, often enter into a return agreement with their source. Segregated brass may be returned for weight credit. Mixed brass, bronze, and copper alloys are returned for copper value. Solder and solder dross are often in a refiner's return service category. The solder maker charges for the service of converting the dross into usable solder. The service charge is for refining, plus the cost of adding necessary virgin metals to recreate required compositions.

Scrap dealers' woes are exemplified by today's picture in iron and steel scrap. Edwin C. Barringer, who is executive vice president of the Institute of Scrap Iron & Steel (ISIS), says, "The mills have given our industry a metallurgical potpourri (although not deliberately) by adding so many new elements to steel products, which we depend on for our scrap supply. All the nickel, copper, zinc, lead, enamel, and other substances the mills blend into their materials to meet customers' specifications for tailor-made steel products are just contaminants that have to be burned out to process high-grade ferrous scrap."

To learn how to reduce the scrap dealer's woes—and increase the plant's scrap profits . . .

Turn the page

A Brief Scrap Recovery Bibliography

Circular NF-58, Non-Ferrous Scrap Metals. Published by National Association of Secondary Material Industries, 271 Madison Ave., New York 16 (available on request).

Aluminum Scrap Classifications (March 1958). Published by American Smelters Research Institute, Chicago (available on request).

The Story of Scrap, by Edwin C. Barringer. Published by Institute of Scrap Iron & Steel, 1729 H St., N.W., Washington 6, D.C. (114 pages; price $4).

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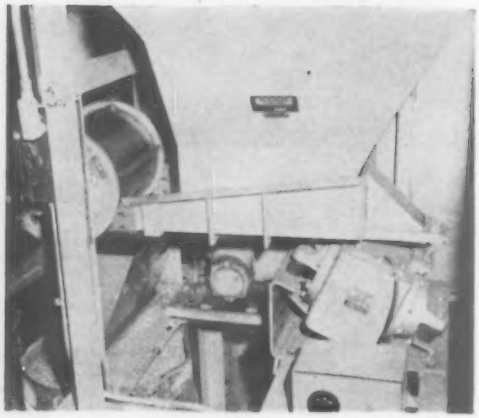
The Story of Magnesium, by W. H. Gross. Published by American Society for Metals, Cleveland (272 pages; price $3).

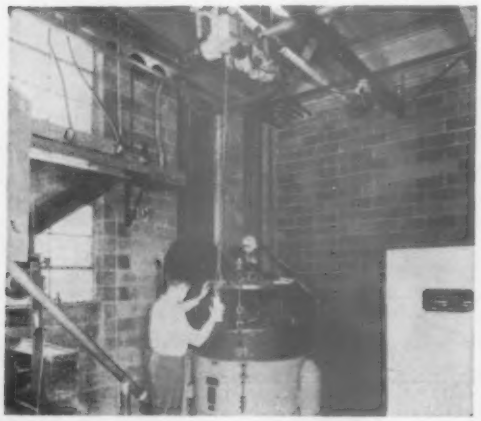
For good scrap recovery . . .

SEGREGATE AT SOURCE. This telephone plant has placed hoppers beside each of its screw machines.



For good scrap recovery . . .

REMOVE IMPURITIES. This separator uses magnet and vibrator to take impurities out of ferrous scrap.



For good scrap recovery . . .

SPIN OIL OUT. A centrifuge is an important tool for getting valuable oil out of otherwise clean scrap.

For good scrap recovery . . .

SQUEEZE INTO BRIQUETTES. Bailing or briquetting keeps scrap clean, makes it easy to handle and use.

For good scrap recovery . . .

KEEP SEPARATE IN PLANT. This neat operation minimizes possibilities of mixing scrap inside the plant.

For good scrap recovery . . .

KEEP SEPARATE IN YARD. Sturdy concrete partitions keep scrap apart in this outside storage yard.

Well-prepared scrap brings a bigger return

Scrap preparation is a science and an art. To prepare scrap, experts find it makes sense to clean, segregate, and sometimes even crush and compress it in the plant. The reason: It's cheaper to segregate scrap at its source than to separate it later. There was a time when a custom smelter would have 20 experienced men sorting out mixed scrap from dealers. Today the same smelter has two sorters. It can't afford a bigger labor bill. So the burden has largely shifted to the manufacturer. Photos opposite illustrate popular methods.

American Smelting and Refining Company (ASARCO) at Perth Amboy (N.J.) uses many modern identification and sorting methods, uses them to hold down handling costs. Sometimes several alloys in one shipment are mixed when they're received at ASARCO. Unfortunately, it does no one much good to have a hopper full of mixed scrap alloys, or even to know what the various alloys are. Trouble is, separation is an expensive job. Usually, it is much more expensive than segregation at the source would be. There was a time when people could at least get the price for copper from mixed copper-bearing scrap. But even this is not the case today. Virgin copper ores contain fewer different kinds of impurities than some modern mixed alloy scraps containing beryllium, selenium, and other exotic elements. In practice, primary refiners of copper must have a higher copper content from scrap sources when exotic impurities are present. Higher than they require from their ores. This is also essentially true for aluminum alloys, ferrous scrap, and the white metals.

The magnet is the hero in scrap separation as well as in scrap identification. The electromagnet is used when both a pick-up and a release are required. Permanent magnets, especially powerful with their modern nickel alloys, are favored for separation of ferrous impurities from non-magnetic metals. The Miehle Company, a Division of Miehle-Goss-Dexter, Inc., Chicago, has just set up a system consisting of a hopper over a vibratory feeder and a permanent, non-electric magnetic agitator-type drum. Miehle's unsegregated scrap contains both magnetic and non-magnetic metal in the form of shavings, borings, chips, etc. The company gets higher scrap prices by separating magnetic and non-magnetic materials. Unsegregated scrap is dumped into an overhead hopper. It is face-fed automatically (at controlled speed) against the revolving magnetic drum by the feeder. The magnetic action of the drum snaps the ferrous material to it and its revolving cylinder carries it to a discharge chute. The non-magnetic material falls from the tray of the feeder into another chute. This technique enables Miehle to salvage more scrap, and get better prices for it. The cost of installing the equipment will be completely recovered in about one year. In this case, contrary to the general rule, it's cheaper to separate the scrap later than to segregate it at its source.

Where cutting oil is not a water dispersion, it usually pays to remove it at the factory. (Water-dispersed cutting fluids are not worth the expense of recovery, so they go out of the plant with the turnings.) Gravity and time will get a lot of cutting oil out, but FACTORY found centrifuges and filtered pumping systems in vogue and paying for themselves. Conclusion: If the oil has value, the plant should centrifuge it out and recover it before selling the metal. The price paid for scrap metal is usually based on the weight of the metal alone. The oil that's shipped with the turnings doesn't produce revenue. Without filters, the small plant centrifuge set-up costs $5000. One man can operate the equipment for about a ton of turnings a day. Since the price of cutting oils is fairly stable, centrifuges are a sound capital investment.

When large quantities of oily brass borings and turnings are involved, a highly specialized boring briquetter is sometimes justified. The pressure exerted to produce the briquette squeezes out the oil. The important function of the machine here is to consolidate the fine particles into slugs for the melting operation. These machines are used in the larger plants and non-ferrous mills, and cost about $50,000. Like briquetters, small practical balers for sheet metal fabricators are found in some small metalworking plants. But even a 9x9x18-in. machine costing $15,000 to $20,000 is more likely to be found in a dealer's establishment. When these presses get down to a 6-in. size, they cost $10,000.

Cleaning of scrap is aided by electronics today. Electronic detectors for metal cost approximately $5000. They are used in the glass, plastics, pulp, and paper industries. For example, one electronic glass cleaning operation sorts out any tramp metals in the cullet from crushed TV tubes. The cullet is used in melts to produce glass for new tubes. Tramp metals, unless removed prior to melting the crushed glass cullet, cause discoloration. The electronic detection systems are based on balanced inductive fields which are unbalanced by presence of any metal. When a field is unbalanced, a buzzer goes off.

Turn the page

SCRAP SCRAP SCRAP

SCRAP
SCRAP
SCRAP

Better handling aids scrap recovery

A plant can make or break its scrap recovery program with its techniques for containing and transporting scrap through its buildings. Whereas there is some question about the economics of balers and briquetters, there is none about the investment for material-handling equipment in scrap recovery programs. Today's trend in scrap handling is up—in line with over-all mechanization. But most plant scrap-handling programs are at least a few notches behind improvements in production techniques. For example, air transport through pipes from production machines to storage or transport hoppers usually pays for itself, but is not as prevalent as it might be. Labor costs are no different for scrap recovery than for production. Progressive plant managers find hidden profits when they apply production transportation techniques to their scrap programs.

Simple flow lines for raw materials, product, and scrap are an ideal that factory managers strive for. But when products are made in individual departments the flow lines tend to crisscross and sometimes interfere with each other. This is especially true of scrap handling, where one class of scrap might be produced at a dozen machines scattered through the plant. Each plant department might produce many classes of scrap, such as yellow brass turnings at 10¼ cents per pound, copper wire at 21 cents per pound, cast-iron borings at $15 per ton, and black iron skeletons at $28 per ton. Mixed, they are practically worthless. If the brass turnings were mixed with the wire, they would bring only the price of the turnings. The same relationship holds for the ferrous material. So it pays to have four scrap flow lines, even if they do create a handling problem.

At Western Electric's plant in Indianapolis, 1,300,000 square feet of floor space is laid out as dozens of individual shops. Scrap handling is a big problem. The company solved a 50-tons-of-scrap-a-day problem with self-dumping hoppers and radio-equipped platform trucks. Here's how it works: Each machining area has hoppers assigned to it. Whenever possible, they are located directly at the scrap-producing machine. Where this is not feasible, the scrap accumulates in tote boxes or bins, which are then manually dumped into the hoppers. Full hoppers are picked up by a radio-dispatched platform truck. Turnings are taken to a chip-crusher. The chip-crusher produces chips that are easier to handle and bring a better price than the turnings would. Following crushing, the turnings are separated from their cutting oils in a centrifuge. Oil is reclaimed, and the dry chips are hauled to concrete storage bins adjacent to the railroad spur (bottom photo, right, page 108). Other material is taken directly to bins in the scrap yard for ultimate shipment.

The photos at left are a few of many examples of good handling that FACTORY saw while preparing this article. One good example of air transport (top right photo) was in a plant that makes rotor laminations. Small pieces of thin-gage steel are continuously generated by a battery of hydraulic presses. The plant's problem was that machine operators were literally ankle-deep in scrap metal. Punchings were dumped and later carried away manually. The new air transport system has solved this. Scrap now comes out of the machines and into hoppers that feed scrap directly into vacuum-conveying pipelines. Scrap from several machines is sucked to one cyclone separator tank over a final scrap hopper.

Another case: A large automotive plant uses magnetic conveying with inclined chutes. Conveyors (top left photo) now carry scrap up from punch presses to a large, three-wheeled scrap hopper. When the hopper is filled, it is towed away and replaced with an empty one. Scrap used to accumulate in small tote boxes under each press, and the operator would have to empty each small container every few minutes. This new magnetic conveyor arrangement eliminates that labor.

Containers for scrap handling are revenue-producing tools, often more versatile than scrap-processing devices. The same containers can be used for scrap, raw materials, product, and even wastes in a plant. It is a good idea for the plant and the scrap dealer to agree on compatible equipment.

Prices in this competitive field suit every purse. Tubs and trays sell for $60 and up. Self-dumping hoppers start at $150. Closed dumping containers of about 2-cu.-yd.-capacity go for $400, and up, finally reaching the price of the container shown in the lower right photo on the facing page at Carrier Corporation's plant in Syracuse, N.Y. This container is 19 feet long, 8 feet wide, 40 inches deep. It costs $1500. The hoisting unit consists of tractor ($12,000) and carrier ($5000), and can serve about 20 of these containers in an industrial area of several plants. Smaller boxes can be carried on the same rig. A scrap dealer owns the entire outfit, but it is possible for the dealer to own the tractor and the plant to own the containers.

SCRAP SCRAP SCRAP

FIVE FACTORS IN DECISION MAKING

1.

SITUATION ASSESSMENT

Size up the decision situation by digging into the facts affecting it.

2.

SELF ANALYSIS

Ask yourself, "What's my line?" Determine your individual slants and biases before deciding.

3.

ADEQUACY OF ALTERNATIVES

Be sure the scope and magnitude of your decision fit the situation.

4.

TIME

Don't rush your decision when the situation allows additional time for research of facts.

5.

CONTROL

A firm, unalterable decision is fine, but most situations allow step-by-step building block control.

DECISIONS

YOU'LL DO BETTER

By AUREN URIS
Research Institute of America, New York City

The decision-making art is up in the air. Go through current management literature on the subject and you will find two approaches:

- Learned, technical articles on game theory, mathematical models, concept of probability, and so on.
- How-to-do-it articles, usually some version of the standard three-step approach: (1) select the objective, (2) develop and compare alternatives, (3) select the best course.

Between the highly technical approach and the lowly oversimplification, the practical plant management man is left dangling. What's worse, he's in mid-air over an abyss where the dragons of failure below are particularly deadly. Decision making lies at the heart of the management function. Says one management writer, "Managers, when you get right down to it, are paid for one thing: making decisions."

WHERE TO TURN

Where is today's manager to turn for help? It's of no use to him today to know that in 15 or 20 years scientists will formalize decision-making techniques and offer him a dependable tool. Right now he's beset by a dozen crises that require decisions:

Sophisticated methods—For everyday situations, the technical approaches, such as game theory and probability, provide little immediate help. Even where the manager can follow the line of reasoning and make sense of the mathematical formulas that often pepper the page, translating the abstruse theory into practical terms is usually more elusive than he'd like it to be.

Pat formulas—These devices (for example, select the objective, develop, compare, and select alternatives) also leave much to be desired. In the more primitive days of management, we felt we really had something in this approach. But as we became more experienced, the flaws began to appear.

To begin with, selecting the objective itself requires making a decision. Then, for some situations, there are almost limitless alternatives to consider. When do you stop? Finally, selecting the best alternative begs the question, because if you could tell

IF YOU UNDERSTAND THE PROCESS

by inspection which is best, you wouldn't have to bother with the rigamarole in the first place.

Pat procedures—An even more cogent argument can be made against these. Top decision makers don't follow them. Ask your several acquaintances who have to make decisions all day, day after day, how they do it. You'll get answers like these: "There aren't any rules." Or "Don't ask me how. You might as well ask Sam Snead to tell you how he swings."

A FRESH TRAIL

The two extremes we've been talking about—the technical approach and the oversimplified approach—have one thing in common. They both deal with how decisions should be made. Another approach that holds out constructive assistance is to investigate how actual decisions are made. In the paragraphs that follow, you'll find this approach developed to:

- Identify and help you to understand the approach you yourself use to arrive at decisions.
- Suggest adjustments that will help improve your decision-making results.

To analyze the process, let's give a group of managers a sample situation and ask them to come up with a decision. The quality control manager of X Company has quit. Three people are available for the job:

Applicant A. He was the subordinate of the quality control manager, and is in line for the job. He's capable, prepared to take over at once, and sure to be able to perform up to present standards.

Applicant B. He's an up-and-comer from shipping. Would need training, but eventually could be expected to turn in an outstanding performance, much better than that of Applicant A.

Applicant C. He's headed for big things in the company, but needs the quality control job as a stepping stone for a higher position.

The objective here is *not* to observe the mechanical process by which the managers make their decisions—for example, whether they make a list of alternatives—but to determine their general approach.

Five major factors in decision making

Chances are, you'll see five characteristics of decision making in the way these managers perform. Although characteristics vary from one manager to the next, they generally can be identified in five forms:

1. Situation assessment. The manager's attempts to size up the given situation will set them asking questions such as these: What's the policy on promotions? What's the work record of each individual? How is his health? Age?

In getting the answers to these questions the managers eventually will assemble facts that make possible subsequent decision-making considerations.

It is in this assessment phase of decision making that you must reach a concise idea of the situation. The manager who must decide what to do about a shortage of clerical help must be sure the problem is really a shortage—not low pay scale, inaccurate job description, or poor job-recruiting methods.

2. Self-analysis. As each manager's decision-making technique is revealed, this basic fact will emerge: *Personal bias does affect decision making*. Whether he depends on reason or intuition, a manager's personal bias will hold up consistently. Here are some slants, or biases that appear—for the most part—outside the awareness of the managers who use them.

. . . *Minimum cost*. This is a common bias. Many managers select a course of action that involves the least expenditure of money.

. . . *Minimum risk*. Some managers show a preference for the course of action that promises the least harmful consequences.

. . . *Maximum risk*. "Nothing ventured, nothing gained" is occasionally the approach. Here the manager bets on the course of action that has the most risk, but also promises the most gain.

. . . *The humanitarian touch*. The alternative chosen in this case is the one that favors the human relations aspects of the problem.

Awareness of slant or bias is important because it stresses the individual orientation of each decision maker. Your slant will almost certainly reflect your own unique ideas and values.

3. Adequacy of alternatives. This is the phase in which the decision maker answers the question,

"Is the kind of action I'm considering appropriate to the magnitude of the situation?"

One manager may ask, "If we appoint one of these three applicants—A, B, or C—will we be taking care of all the aspects of the situation?"

This kind of question may lead one manager to realize that making a decision sometimes creates difficulties that, in turn, require additional decisions. Accordingly, handing the job to either Applicant B or Applicant C might mean that Applicant A would require a consolation prize, which, in turn, would demand another decision.

Adequacy of alternatives is important. Failure in this area can lead to outcomes such as the classic "too little and too late" situation. Let's consider the predicament faced by the works manager of a toy factory. One of his divisions is in a mess because of poor housekeeping.

"Get this place straightened out," he warns the division head, "or you'll be stuck at inventory time."

The division head tells his foreman to put two men on the job of cleaning up the department. The foreman does, but when inventory time comes around, the surface of the problem has barely been scratched. The adequacy of the course of action had been judged incorrectly. What had been assessed as a situation requiring only minor effort really required a decision of heroic measures.

4. Time. "What's the difference between a good naval officer and a bad one?" Admiral Arleigh A. Burke was asked. "About 10 seconds," was his answer. Good anecdote, but don't go along with the implication that the fast decision is necessarily the best. From your own experience you can probably demonstrate that the slow decision, or in some cases no decision at all, may be best.

Of course, the situation itself often dictates the time required. You can decide routine affairs in a matter of seconds. More complicated situations, demanding large outlays of time simply to understand what's involved, may take months.

5. Control. In considering a decision, some managers think in terms of a single, decisive course of action. Others look for ways and means to control the implementation of the decision, to break down the action into a sequence of moves, each dependent on the outcome of the one before. This consideration lessens the risk.

Practical decision makers are aware that often it's not so much how you decide but how you implement the decision that makes or breaks you.

It is often the manager's picture of himself as a decision maker that determines whether he designs the one-shot decision, or the chain variety. Some managers like the self-image they see when they are quickly decisive. They feel a surge of power when their decisions are firm: "The die is cast. Let 'er ride." To managers using the more deliberate approach, the feeling of control heightens their feeling of confidence and security.

How to upgrade your decision-making approach

You have read about the five factors that affect decision making. Now let's review them, one by one, and see how you can upgrade your general approach.

1 SITUATION ASSESSMENT

Size up a situation by digging into the facts of which it's composed and by which it's surrounded. And ask questions: Who's involved? What's the nature of each person's involvement? What precedents are there? Why is a decision necessary? What will the decision accomplish?

In addition, after you have gone as far as you can —or as far as you think you should to get a satisfactory "model" of the situation—then apply a set of values to help you put the situation in perspective. In employee relations you may have to decide, for example, whether you're dealing with an absentee problem or one of general demoralization.

It's important to realize that assessment is not done as a "step" that is promptly followed by a succeeding step. Assessment is a continuing process. You may make an assessment that is superseded not once but many times, as you continue the decision-making process. For example: In the job-filling situation given the test group, one manager started out by considering the situation as simply one of filling a job vacancy. As he thought it through further, it became, in turn, a test of promotion policy, a question of maximum utilization of human resources, and, finally, a situation that clearly involved executive development.

2 SELF-ANALYSIS

Begin by asking yourself, "What's my line?" That is, in the decisions you make, to what viewpoint, to what values do you give precedence? The possibilities listed previously—minimum cost, minimum risk, and so on—can start you toward the answer.

Think in specific terms. Don't try to answer the

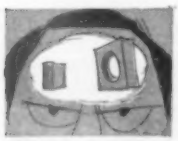
question in the abstract, but recall your last half-a-dozen decisions.

Ask yourself, "What facts do I always look for in weighing a decision?" If you find you almost always want to know the cost factors, then perhaps you're in the "minimum cost" category. If you find yourself mainly preoccupied with what your superior may say, then you may belong in the "minimum risk" group. And don't be self-conscious about the category in which you finally place yourself. No matter which one it is, you'll have good company.

The importance of tagging your decision slant is this. Once you identify your slant, you're in a position to remind yourself of two things:

• No slant, however worthy in itself, is appropriate to all situations. Take the case of a production manager who generally operates on a "minimum risk" basis. Along comes a situation involving a possible materials shortage. His normal approach—tight inventory—doesn't fit. He has to alter it to come up with an effective decision.

• It's possible to make a decision that goes contrary to your usual approach. Let's go back to our production manager above. He has been operating on a hand-to-mouth basis to keep inventories low. Now he realizes he must make a decision counter to his usual tendency. Accordingly, he decides to stock up heavily. True, he's increased his risk. If no shortage develops, he may be in a spot. But notice that once aware of his bias, he can make a decision that gets closer to the reality of the specific situation he is facing.



3 ADEQUACY OF ALTERNATIVES

Most decision makers will pass automatic, instinctive judgment on the magnitude of the situation requiring a decision. In key decisions, where a great deal depends on the outcome, take a moment to ask yourself: "Is the magnitude or scope of the decision course I'm considering in keeping with the magnitude or scope of the situation?"

Don't send a boy to do a man's job. Don't send a man to do a boy's job.

4 TIME

Are you fast on the trigger? Or, when it comes to a decision, do you prefer to "sleep on it?" The fast decision may prove to be premature. The slow one may turn out to be a costly procrastination.

Here again, neither course is "right." Some situations call for one approach, some for another. Here are some of the possibilities:

• The fast decision is right when the situation has a culminating deadline, or when considerable losses accrue with delay, or when there's nothing to be gained by delay.

• The deferred decision is right when there's time to gather additional facts about the situation—when clarification of issues is necessary—when a situation must ripen. (An example of the latter: You decide not to announce the successor of a man who is to retire, even though your mind is made up on the matter, because you want the retiree to get used to the idea of leaving without feeling that he's being pushed out the door.)

To put it another way, the adjustment in the time required for your decision making should reflect not only your natural tendency in this direction (you couldn't block this out even if you wanted to) but also the many time factors that are usually inherent in any situation.

5 CONTROL

Distinguish between the decision that must represent a single, unalterable commitment and the one that can be kept tentative or partial.

Don't disregard the firm decision, vigorously implemented. On the contrary, you often find it's the fact you're staking so much on a single judgment that motivates a successful effort.

On the other hand, the average situation permits a good deal of flexibility. Here are the ways you can control your decision situations:

• **The test, the trial.** "Let's go ahead with Vendor A," says the plant manager. "If his service works out O.K. for us over a three-month period, he'll get the contract."

The test approach may be a time test, a simple small-quantity test, or a test that is actually a course of action to expose a prospective decision to a number of criteria, after which a final decision may be made.

• **Step-by-step.** Some courses of action may be segmented. "Let's start with Phase 1," the manager decides. "If that turns out negative, we'll follow it by Phase 2. But if it turns out positive, we'll skip Phase 2 and turn to Phase 3."

In other words, with this method you don't have to commit yourself to a set course of action. Instead, you break down the action into a chain of decisions—each link of which can be decided by the outcome of the preceding one.

Feedback helps you tailor your decision in line with developments. "Start training Bill for that foreman's job," says the manager. "But keep close tabs on his progress, so we'll be able to modify his training according to how well and how quickly he absorbs the information."

Many courses of action permit feedback that makes shifts of direction possible. In such cases, you don't have to decide on your entire program of action in advance.

AUTHOR DUNLAP (above, and right—at Ford's Dearborn metal stamping plant) led 1960 Plant Maintenance Executive Study Group. Says Dunlap: "Any doubt in my mind about the maturity of maintenance was dispelled at the meeting."

Executive Study Group Finds Maintenance Shedding Old Ways

- Now—maintenance men are using industrial engineering techniques
- Now—maintenance supervisors accept work measurement as a valid tool
- Now—maintenance managers are more savvy—no longer fooled by gimmicks
- Now—maintenance costs undergo strict accounting scrutiny

Early this year 20 top maintenance men met behind closed doors to cast a super-critical look at "Maintenance Performance Analyses."

Place: Philadelphia, Pa.

Occasion: A meeting of the Plant Maintenance Executive Study Group (ESG), following 1960's Plant Maintenance and Engineering Show and Conference.

Conclusion: Measurement of maintenance performance, with latest techniques and concepts, is an accepted fact with the top men in the field—men who talk practical working maintenance, not theory.

Twelve of the 20 men are in direct-line maintenance jobs—plant engineers, superintendents, maintenance general foremen. Seven of them are staff men, in jobs directly supporting maintenance—such as cost engineering, central staff management. Two of the "big 20" are industrial engineers.

They represent plants ranging in size from 400 to 22,000 direct workers. And they represent plants where maintenance departments range in size from 43 to 3550 men.

When the meeting closed I got this feeling: If you're still depending on 1950 maintenance management methods, you had better pay attention and sharpen up—or be left behind.

Here's a report on the findings of the Plant Maintenance Executive Study Group.

By T. A. DUNLAP, Assistant Director, Plant Engineering Ford Motor Company, Dearborn, Mich.

PERFORMANCE STANDARDS

Establishment of standards for worker performance was considered a vital area. Reason: Maintenance performance analysis is possible only when a base is established for any kind of work a craftsman may do. More than half the Executive Study Group employ standard time data. Work sampling was considered to be especially valuable in checking validity of standards, particularly when the sampling is conducted by supervisory personnel.

Problems develop for the maintenance manager, the group agreed, when he tries to determine the amount of actual work accomplished and when he attempts to measure the quality of maintenance work. To help the manager solve these problems, the ESG offered these suggestions: continuing supervisory inspection; continuous maintenance cost accounting (which shows true costs and cost trends created by

deferred maintenance); and work sampling (which forces observation of details on maintenance jobs).

Incentive pay programs are being used by only three of the companies represented by the group. They agreed a union shop has a definite bearing on performance analyses, requiring management to pay constant attention to measurement techniques. All but three of the 20 companies represented operate a union shop.

COST AS A GUIDE

Reliance on cost alone as a performance guide can be a misleading standard, the group agreed. Reason: Cost does not disclose undesirable build-up of deferred maintenance.

Accounting methods for measuring maintenance performance and for tracking maintenance costs received unanimous approval.

Each of the individual accounting systems discussed by the group was tailored to the specific maintenance problems of the individual plant situation. The 20 men were impressed with the growing use of electronic data processing equipment for recording maintenance costs.

This year's Executive Study Group favored using cost per unit of production and cost per dollar of sales in relation to direct labor as base figures for measuring maintenance costs.

PERFORMANCE EVALUATION

Indexes in maintenance performance analyses are valuable only when compared with plant historical data (adjusted for changing dollar values), or data from similar industries, the group contended. It considered regular reporting devices to top management valuable. Critical importance was also attached to good communications, up and down the line, which serve to ensure consistent top management and labor support of good maintenance management practices.

For example, proper understanding of the maintenance function will avoid dangerous postponement of current work to deferred maintenance status.

METHODS IMPROVEMENT

Discussion in this area was confined to the consideration of equipment and materials. It was evident that each man present had given extensive attention to methods of supplying, handling, and costing maintenance materials.

The group agreed on these aspects of material control practices: storage of low-cost material items in "free stores" to allow ready and easy use; and assurance of proper inventory by minimum-maximum control.

Though not on the original agenda, maintenance training, as an adjunct of methods improvement, underwent heavy discussion. The group chorused agreement that maintenance performance scores are affected in large measure by the level and the effectiveness of training. This opinion, they said, applied to job training and management training as related to particular plant needs.

EQUIPMENT IMPROVEMENT

Discussion here included equipment used in maintenance work as well as equipment being maintained.

The 20 men strongly agreed that the nature of production equipment *does* affect maintenance costs. In this regard, most of them said they do exert some influence in assignment of specifications to production equipment. They exert similar influence on design of equipment loading procedures.

Group feeling was that the effect of equipment on costs is hard to measure and record in any standard performance report. In addition, they agreed, good maintenance supervision and rapport with other management circles play a large part in holding down machine and equipment maintenance costs.

MANAGER RESPONSIBILITY

Is the maintenance manager responsible for getting the type of data essential for performance analyses?

Though the question was not answered directly, I did sense, from the group's general discussion, that the maintenance manager *is* responsible for this data. He cannot rely upon top level directives or existing accounting practices to supply all the data needed for analysis of the maintenance function. The maintenance manager must spell out his data requirements, and ask that they be fulfilled. But he does not have to prove that he needs this data. Nor does he have to prove his need to top management in order to justify his departmental performance and contribution to lower costs.

AND—TO WRAP UP

Summing up, the first Executive Study Group on maintenance performance analyses did not reveal the existence of any startling or extraordinary new methods of performance analysis.

But the art of maintenance performance analysis is progressing to a dependable status. It should fill a gap in maintenance management that will insure the continuing maturity of the function.

THE CHANGING LABOR FORCE...

"The 1960's will bring dramatic changes in our manpower posture—both in the numbers and kinds of people available and in the kinds of work they will be required to perform. The problems of recognizing, developing, and fully using our manpower capabilities will challenge all of us—management, labor, educators, and government."

—James P. Mitchell, Secretary of Labor
(in a letter to FACTORY)

...AND WHAT IT MEANS TO YOU.

The exciting challenge presented by the manpower trends sketched on these pages can provide you with some of the greatest satisfactions —and some of the knottiest problems—of your management career.

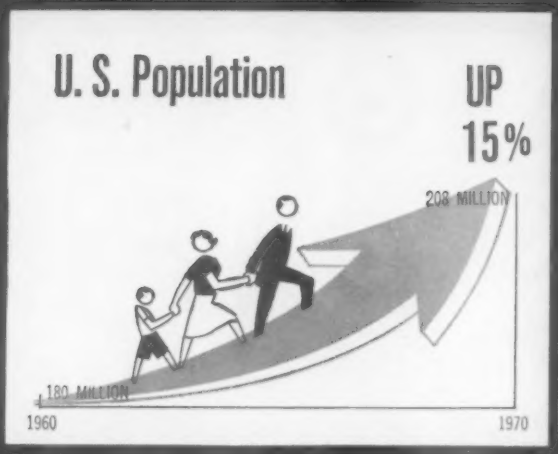
In the next ten years, through death, retirement, and other causes, the labor force will lose 15-million experienced workers, replacing them with 26-million inexperienced workers. Supervisors and skilled workers will be scarce and technological advances will continue to keep things in a general uproar. All this adds up to headaches. Among them:

- Training far more young workers, who are notoriously inclined to scamper off afterward.
- Getting along with proportionately fewer supervisors than ever before.
- Having it out with labor unions over jurisdictional matters, work rules, apprenticeship.
- Supplying yourself with really sharp personnel, wage, time-study, and training specialists.
- Managing—and measuring—the work of these "non-productive" specialists and administrators.
- Changing some of the entrenched ideas in the front office—and perhaps in your own.

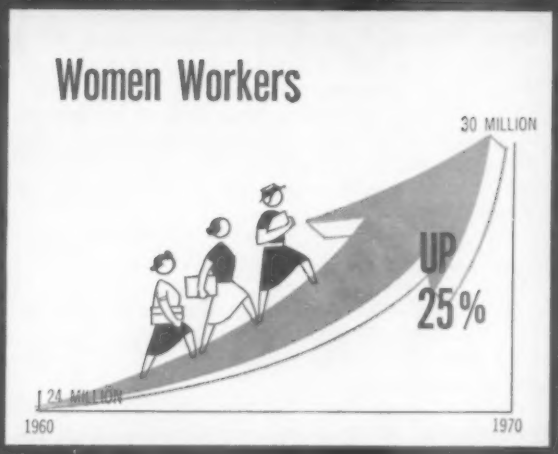
But the picture is not all black by a long shot. If you can reschedule certain jobs, a horde of part-time workers will pounce on them. Barring a real calamity, the national standard of living will scramble to a new high. We can have a $750-billion economy—a 50% rise—by 1970. That's the fastest climb in history, dwarfing even the '50's.

The charts on these pages show what will happen. When looking them over, remember they are not based on guesswork. The people who will bring these changes about are already in school—or working. Some tips—22, in fact—on what you can do to get ready for them are listed on page 120.

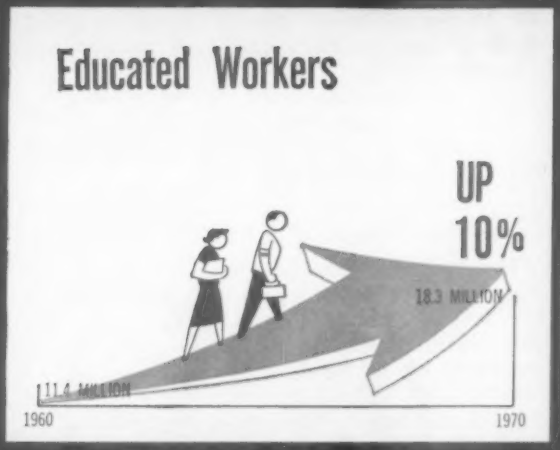
Turn the page



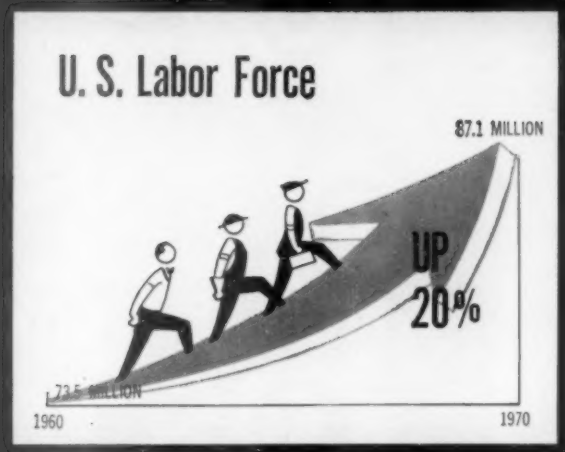
IN THIS DECADE, A BOOMING POPULATION

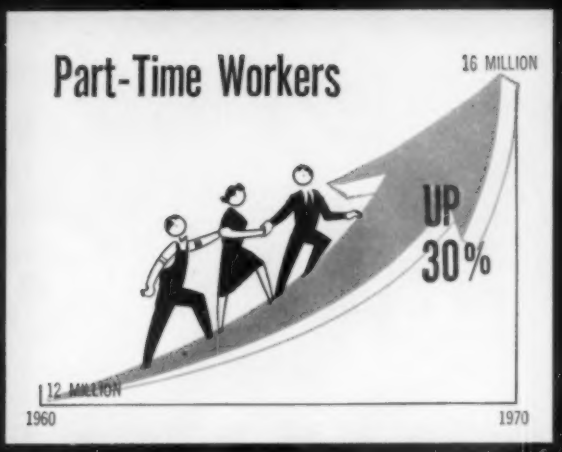


OF THE NEW LABOR FORCE WILL BE WOMEN.

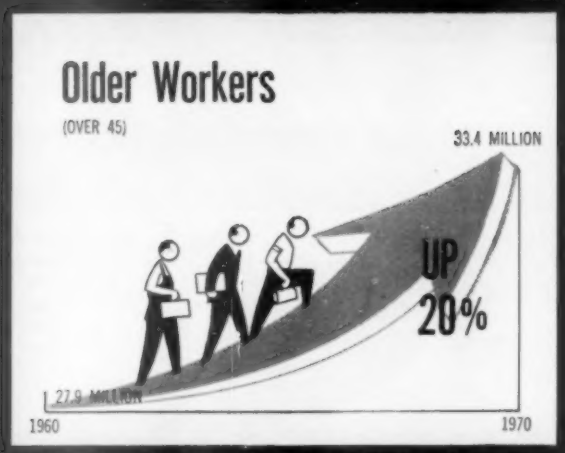


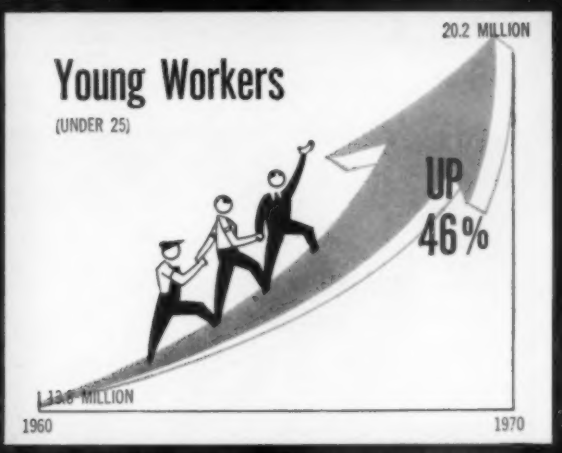
WELL-EDUCATED WORKERS, BUT A SHORTAGE



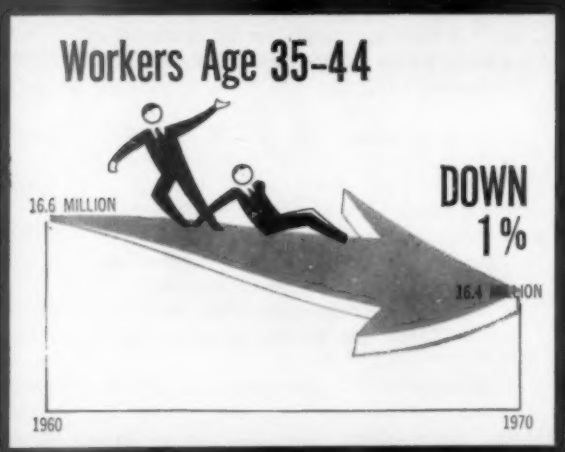


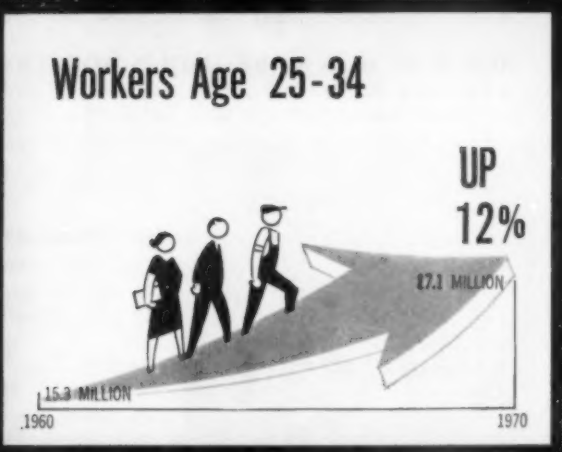
WILL ABSORB THE PRODUCTION OF A GROWING BUT CHANGING WORK FORCE. A FULL THIRD





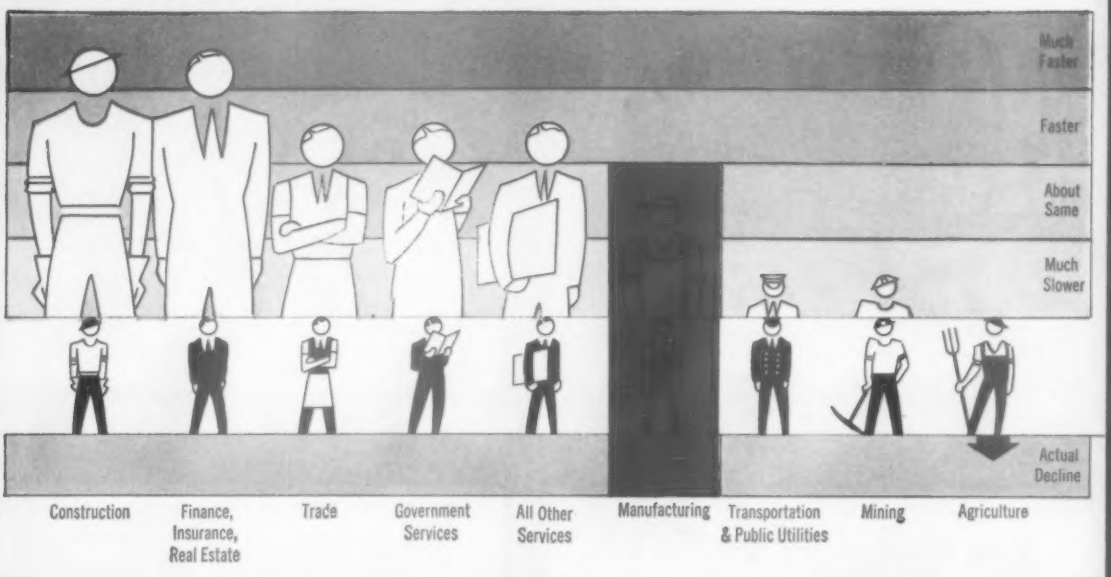
TWO OUT OF EVERY FIVE WORKERS WILL BE OVER 45. YOU'LL SEE A FLOOD OF YOUNG,





OF SUPERVISORS AND HIGHLY SKILLED MEN. PROVEN, MATURE WORKERS WILL BE SCARCE.

Relative Employment Growth by Industry, 1960-1970



OTHER INDUSTRIES will give you fierce competition for the most desirable workers. Even within manufacturing, the "growth" fields are liable to skim off much of the cream—managers, craftsmen, and technicians.

. . . 22 tips on THE CHANGING LABOR FORCE

What to do about MORE FEMALE WORKERS:
- Recognize that young women respond to short-term benefits, don't expect to work long.
- Use women at jobs they do best (intricate assembly, routine work). They're content, can free men.
- Remember that older women make good supervisors and foremen, are often master psychologists.
- Treat them fairly. Many rank this above high pay.

What to do about MORE OLDER WORKERS:
- Put older workers in training and advisory jobs, to harness their experience, skill, judgment.
- Build them up in the eyes of junior men. Older workers are conscientious, loyal—good examples.
- Consider longer vacations, gradual retirement.

What to do about MORE YOUNGER WORKERS:
- Train these quick learners to be more adaptable, do broader, more technical work than predecessors.
- Hire discriminately and use longer probationary periods to cull out the dim bulbs.
- Encourage night school, correspondence courses.
- See that they get attention after placement. If you simply let them "drift," they'll do just that.
- Tighten up your safety and health programs to protect the inexperienced.
- Work with schools to improve prospective workers.
- Promote ambitious men promptly, at least in prestige. These hustlers move—either up or out.
- Listen to their suggestions, ask their advice. They're candid and have a fresh outlook.

What to do about FEWER WORKERS, AGE 25-45:
- Consider bonuses, thrift plans, stock options—anything that will help to hold these choice men.
- Develop your supervisors and managers in an orderly way. If you "just let the cream come to the top," it may turn sour—or be skimmed off.
- Keep highly skilled men circulating among newer craftsmen, teaching, and adding finishing touches.

What to do about THE OVER-ALL SITUATION:
- Bargain hard on featherbedding, fringes, and jurisdictional issues. But *quietly*—don't force the union into a public pose from which it can't retreat.
- Cut administrative and overhead featherbedding.
- Re-examine hiring, training, and promotion policies. Smash age, sex, color barriers.
- Watch the wording of labor contracts to avoid getting boxed into waste-work practices later.

Some of these suggestions, of course, will cost money. But whatever you do, your costs are headed up. Do nothing? No—even an auctioneer to sell your dead business will cost more by 1970.

"It's amazing how utility costs can be cut"—see page 238

He's mopping up the mess for the last time

At a leading aircraft research center, high-frequency vibration caused severe oil leakage from hydraulic lines servicing a huge wind tunnel. Many man-hours each month were wasted cleaning up the basement floor underneath, even though drip pans were used extensively.

Now, after a change to a Suntac oil, the vibration-caused leakage has been reduced to a point where "mop-up" is not needed. Hydraulic-fluid consumption has been cut by 4000 gallons a year. That's economy! That's Sun quality—the best economy of all.

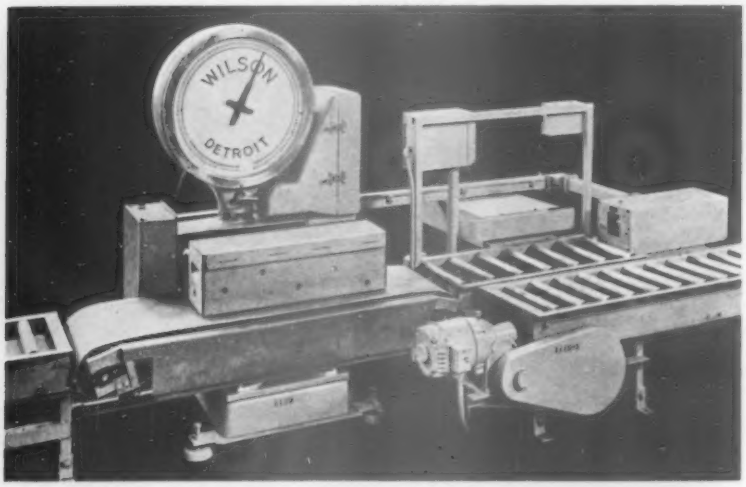
If your plant is troubled with a leaky system, a Suntac antileak hydraulic oil can save you money, too. Ask your Sun representative to show you the Suntac desk-top demonstration, or write direct to SUN OIL COMPANY, *Philadelphia 3, Pa., Dept. F-6 In Canada: Sun Oil Company Limited, Toronto and Montreal.*

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

FACTORY EQUIPMENT NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.



Weighs, Stamps Automatically

Branding a carton or container with its proper weight needn't be a two-step operation. This device does the whole job automatically. Here's how it works: The package is delivered to the weighing machine by any type of conveyor. (A roller-type conveyor is used in the photo above.) It is then transferred onto the belt conveyor of the weighing device. When the package reaches the scale, the belt conveyor stops momentarily and the package is weighed. Weight figure is retained by an electronic memory unit, until the carton moves to a position where it is forced against the marking unit, which stamps the weight on its side.

The Weight Brander is a standard unit, but it can be custom-made to fit any existing system. The self-contained electric drive motor (for the belt) is automatically controlled by a series of switches and relays.

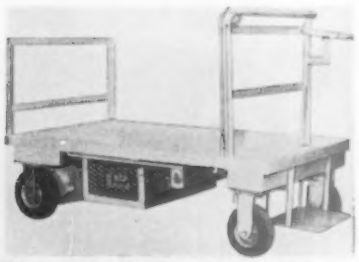
Production speeds above 600 units per hour are possible, depending on size and weight of package. *Wilson Automation Co.* (Circle 88).

91—Leak Detector, mass spectrometer type, spots one part of helium in 10,000 parts of air. Said to be the most sensitive instrument of its type commercially available. Portable; operates in 40 to 100 F. temperature, humidity to 95%. *Consolidated Electrodynamics Corp.*

92—Pump-Valve Control System, using only two wires, continually supervises and indicates status of controlled device. It's said to cut field wiring costs 75 to 85% over standard 7- to 9-wire units. Adapts to new or existing installations. *Vapor Recovery Systems Co.*

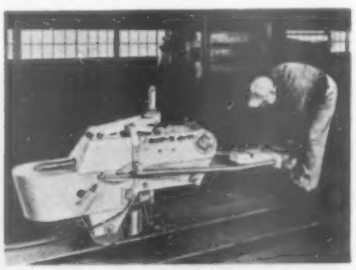
93—Magnifying Lamp combines 5-in. diameter enlarging glass with 22-watt fluorescent light. Useful in miniature assembly work, quality control, etc. Arm with 45-in. reach gives 360-deg. positioning. Dual electric outlet mounted on base is optional. *Swing-O-Lite.*

94—Spray Air Gun delivers coarse hard-hitting drops or gentle mist to clean off dirt or grease quickly. Penetrates built-up film. Extension nozzle for hard-to-reach areas. For use with common cleaning, degreasing materials. Provides 6½ cfm. at 60 psi. *DeVilbiss Co.*



89—Platform Truck has four power casters that permit single operator to transport loads to 1200 lb. up 10% grade with ease. Features forward and reverse speeds to 4 mph., tiller bar steering, dynamic brakes. Low-cost line also includes rider-driven tow tractor. *Morse Corp.*

90—Power Roof Exhauster, made of aluminum, has motor and drive assembly mounted to side, out of air stream. Design gives unit low contour—33 in. high for largest size. Two models: centrifugal, 725 to 22,400 cfm.; axial, 3240 to 27,000 cfm. *Jann-Air Products Co.*



95—Mobile "Sup-R" Drill requires only one man to drill, ream, or countersink up to 1½-in.-diameter holes in heavy metals. Labor and production costs are up to 50% lower than those for fixed installation drills. One-ton magnet holds drill in position. *Guibert Steel Co.*

Turn the page

How American Brake Shoe Maximates Production

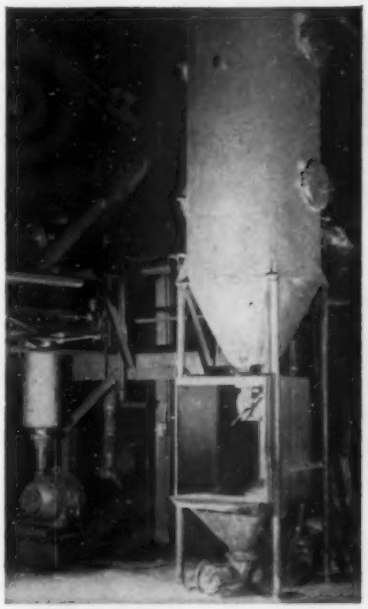
When the American Brake Shoe Company began an extensive modernization program at its New Castle, Delaware plant, one of the first steps management took to maximate production—that is achieve maximum output at less cost—was to install a Hoffman pneumatic conveying system for keeping bentonite, dextrin, silica flour and other materials *on the flow*. With a Hoffman exhauster furnishing the air as well as suction for the handling system, and use of components described here, the equipment not only simplified bulk conveying chores but paid its way in a few months by providing substantial production, material and labor savings.

MATERIAL INTAKE VALVE

Materials are introduced into the air stream through a unique nonclogging intake valve attached to the bottom of a hopper and flow smoothly through pipe lines to any one of six primary cyclone storage tanks more than 350′ distant. Hoffman intake valves insure the uninterrupted flow of dry, powdery or granular materials through all types of vacuum conveying systems. Suitable for use with 2″ through 6″ pipelines, they are equipped with standard 8″ flanges and can be easily attached to bins, hoppers, or dust collectors. Connected equipment is protected from exposure to the full suction of the system by a separate air inlet. The material handling rate can be adjusted while air is flowing. Thorough mixing insures smooth transit.

HINGE VALVE

Self-cleaning Hoffman hinge-type discharge valves are designed for air-tight closure against a head of material. The one-piece valve body is cast of gray iron with its rubber-faced disc and seat completely inside the casing. Lever linkage permits operation by means of chain or cable from a remote station. Provision can also be made for air or hydraulic cylinder actuation of the valve.



A portion of the Hoffco-Veyor system installed at the American Brake Shoe Co. plant in New Castle, Delaware.

ROTARY VALVE

Chain driven rotary discharge valves of cast semi-steel construction feed the material in controlled quantities. Designed for interchangeability of various types of fabricated and cast rotors, valves are equipped with torque limiting drive sprockets for protection against jamming and overloading. Equalizing connections permit attachment of bleed lines to vacuum or pressure source. Inspection of the interior can be made through an access port without disassembly of the valve.

PERISTALTIC VALVE

Controlled expansion and contraction of rubber diaphragms permit discharge in measured quantities. Since there are no internal moving parts, even coarse abrasives can be handled with minimum wear. Sheet rubber diaphragms are easily replaced whenever necessary.

COMPETITIVE ADVANTAGES

In handling quantities of dry, free-flowing powdery and granular materials such as sand, shot, chemicals, etc., Hoffco-veyor systems and components speed production—provide many genuine benefits and advantages which are reflected in higher profit margins. These include:

- flexibility
- cleanliness
- time saving
- lower initial cost
- easy installation
- material saving
- labor saving
- pay for themselves

FREE ENGINEERING SERVICE

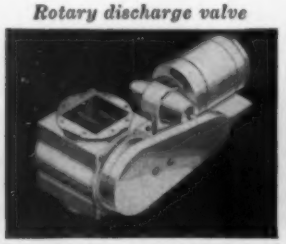
If you have a materials handling problem, you can solve it with either a complete Hoffman system or any of its parts which may be purchased separately to fit your needs. Available equipment includes dependable centrifugal blowers/exhausters, cyclones, collectors, material intake, hinge, rotary, butterfly and peristaltic valves as well as filter bag collectors. We'll be glad to make a free engineering survey to determine how you can improve your manufacturing methods by maximating production with a really tight method of material handling. Send now for a free descriptive booklet. Please write:

Air Appliance Division
Dept. EM
U. S. Hoffman Machinery Corp.
103 Fourth Avenue
New York 3, New York

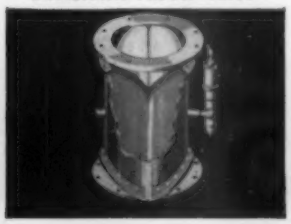
Material intake valve

Hinge valve

Rotary discharge valve



Peristaltic rubber valve



For more facts Circle 444 on Reader Service Card

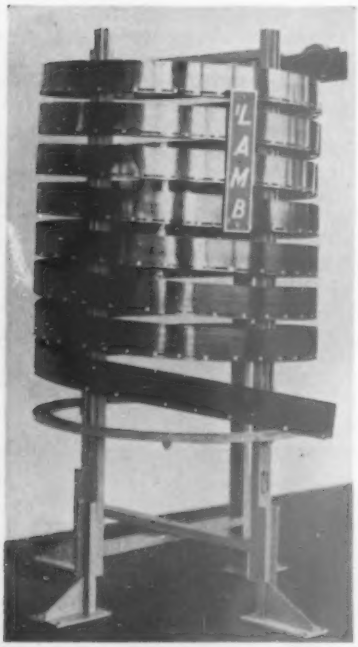
Blows Hot and Cold—11,500 fpm.

It's the rare plant that doesn't have a need to dry things in a hurry. Maintenance workers often have moisture problems in motors, wiring, switches, pipe joints, paint repairs, etc. Production and experimental workers find a need to dry ink, paint, dyes, glues, and the like.

This hot and cold unit blows air at 170 F. or at room temperature. While the velocity of the air stream is 11,500 fpm., the air blown is at low pressure. It won't harm even the most delicate equipment.

The unit cannot be used as a vacuum cleaner. However, it can be used effectively with air sweeping tools and sprayer attachments, and the low pressure air can be used directly for cleaning.

Model E-1 has a 2/5-hp. universal, 115-volt a-c/d-c motor with precision ball bearings, greased and oiled for life. Housing is polished aluminum, reinforced for added strength, with an easy-grip handle. "On-off heat control" switch is heavy duty. Has 20-ft. reinforced rubber-covered 3-wire cable with plug. *Ace-Sycamore, Inc.* (Circle 96).



Chute-the-Chute Has Gravity Flow

Production parts such as pistons, bearings, and blanks roll or slide down this helical storage and lowering unit. Gravity moves the parts, and centrifugal force holds speed in check. The unit is designed to decelerate fast moving parts that may enter it at high speed. Pressure of the part against the outside rail of the slide slows objects down without risking damage to critical surface of part when finished.

Used as a lowering device, unit permits overhead installation of transfer chuting, thus avoids floor level obstructions in the plant.

Chuting configuration is made to suit part dimensions. Chutes are easily reworked to accommodate part design changes. Part flow controls and machine interlocks are optional. *F. Jos. Lamb Co.* (Circle 97).

98—Fire-Hose House has maintenance-free red porcelain-enameled exterior and brilliant white interior. Steel box, identified with large white letters, is fitted with shelves and fixtures to hold hoses and nozzles. Unaffected by rust, corrosion. *Avondale Marine Ways, Inc.*

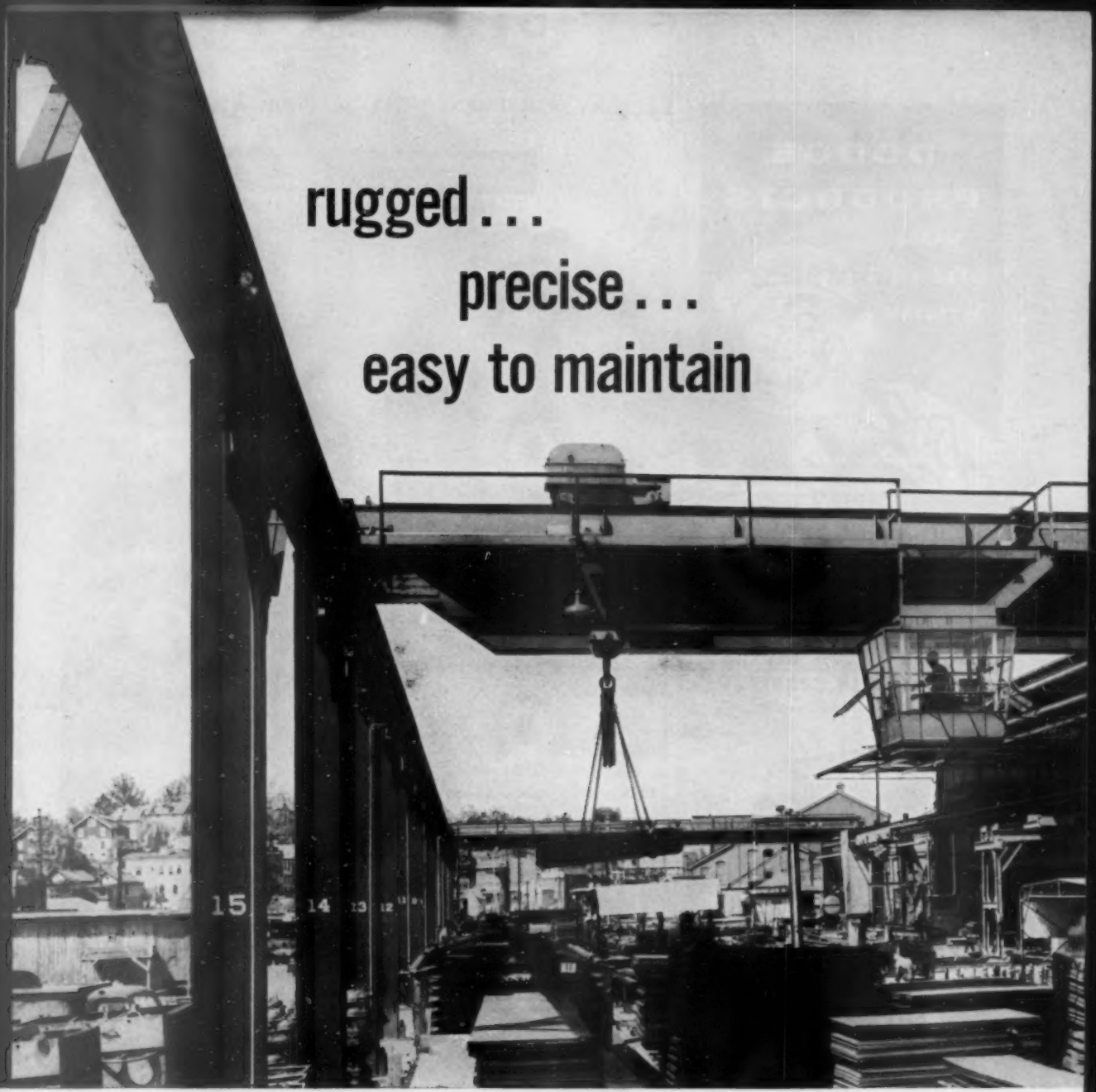
99—Portable Plategage measures thickness of plated or painted surfaces on ferrous base materials in seconds. Measurements, in 0.0001- to 0.015-in. range, are read directly on meter. Works with flat or contoured surfaces. Needs no skill to operate. *Dyna-Empire, Inc.*

100—Tote Boxes and Trays, for heavy-duty use, are formed from high impact, tough, rubber-based Styrene. Strong, yet lightweight, they are available in many colors to facilitate parts classification. Nest when not in use. In sizes to 24x36x12 in. *Premier Plastics, Inc.*

101—Interrupter Switch permits installation of low-voltage load centers with complete stored-energy operation from incoming line to outgoing terminals. Manually operated—safe, reliable. In 4.7- and 13.8-kv. ratings, with 40,000-amp. closing rating. *General Electric Co.*

102—Aluminum Electrical Conduit is lightweight, corrosion-resistant, bends easily. Features include precisely threaded conduit and couplings, and special finish for ease of fishing conductors. In ½- to 6-in.-diameter sizes, 10-ft. length with coupling. *H. K. Porter Co.*

Turn the page



Westinghouse crane control

Precision built to crane-duty standards . . . long-term, low-cost service with easy operation and low maintenance costs . . . the most complete line of magnetic crane control available . . . 'round-the-clock service facilities in all areas . . . all components service-proved . . . undivided responsibility from one supplier . . . just several of the reasons why you can count on dependable, more economical service from cranes equipped with Westinghouse control. Your nearby Westinghouse salesman has all the cost-saving facts. Or, write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-22145

Photo above shows material bay of main carshop of Norfolk and Western Railway in Roanoke, Virginia, in which operate two twenty-five ton Whiting cranes, equipped with Westinghouse Load-O-Matic* a-c control systems, handling heavy plate and other material for car-manufacturing operation. Westinghouse Load-O-Matic crane control is ideal for applications requiring unusual stamina, ease of operation and low maintenance cost. Provides smooth, stepless speed control without the cost and complexity of d-c conversion equipment. *Trade-Mark

YOU CAN BE SURE...IF IT'S Westinghouse

TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

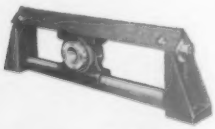
For more facts Circle 445 on Reader Service Card

DODGE PILLOW BLOCKS with TIMKEN BEARINGS

America's Quality Pillow Blocks!

TAPER-LOCK STEEL CONVEYOR PULLEYS

Maximum strength with minimum weight!



DODGE TAKE-UPS

Complete range of stock models, sizes.

●

Write for Bulletins!

- ✓ Rolling Bearings — ratings, data.
- ✓ Conveyor Pulleys — technical data.
- ✓ Take-Ups — Roller, Ball, Babbitted.

DODGE MANUFACTURING CORPORATION
400 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more about these items, circle numbers on Reader Service Card next to back cover.

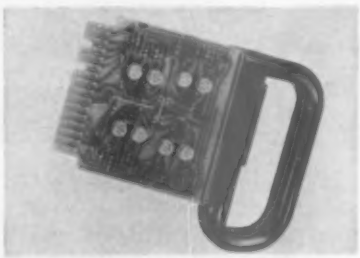
103—Strip Coil Racks have locking nesting plugs for safe stacking and 3-in. underclearance for fork-lift entry from all sides. Available in four sizes for 24- to 42-in. diameter coils weighing to 6000 lb. Retainers to keep coils upright are optional. *Jarke Mfg. Co.*

104—Air Valve uses no air motors or mechanical linkages. Bellows in hollow vanes inflate as air pressure rises. Vanes expand, surfaces meet for shut-off with minimal leakage. In sizes to 16x24 in., 750 to 4800 cfm., at 1800-fpm. velocity. *Connor Engineering Corp.*

105—High-Pressure Unions, 4000 and 6000 psi., have fast make-and-break design for easy installation and cleaning of 2-in. diameter pipelines. Resist clogging. Ideal for pipelines needing frequent disassembly for cleaning and maintenance. *Clayton Mark & Co.*

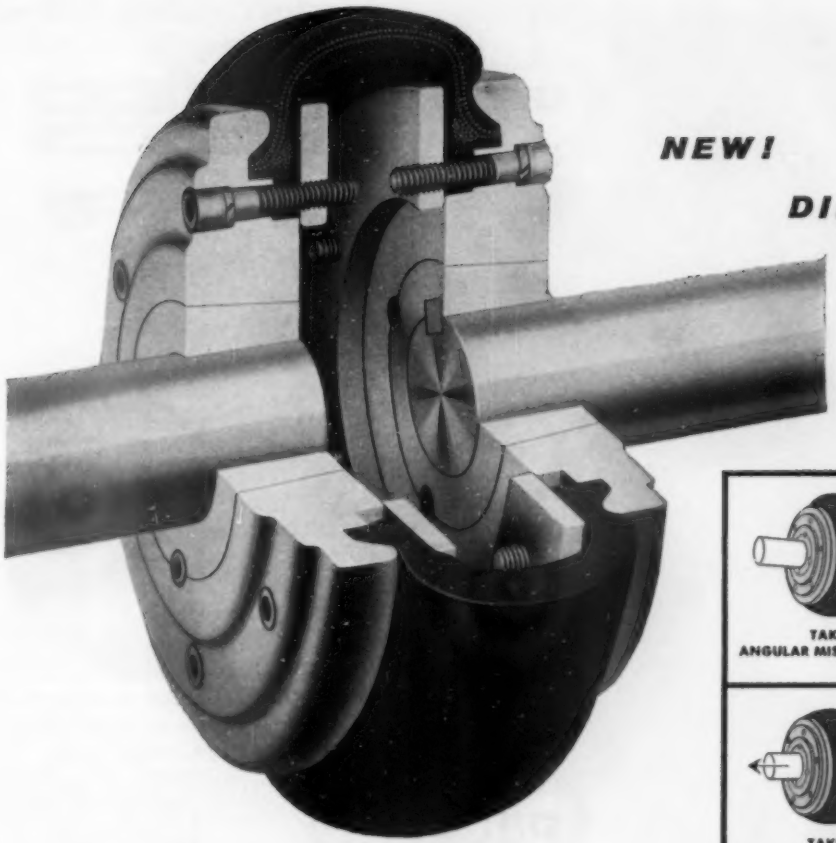
106—Flow Indicator shows at glance that flow is taking place. Visible in bad light, flow makes ball dance in toughened glass dome. Ball drops out of sight if flow stops. Only one moving part—maintenance-free. For ½-in. pipe, to 100 psi. *McIntosh Equipment Corp.*

107—Stapling Heads, gang-mounted in series on conveyor, bench, or packing table, seal container from the outside in one operation. Adjust to different box sizes and thicknesses without tools. Come with automatic touch trip; foot-trip control optional. *Bostitch.*



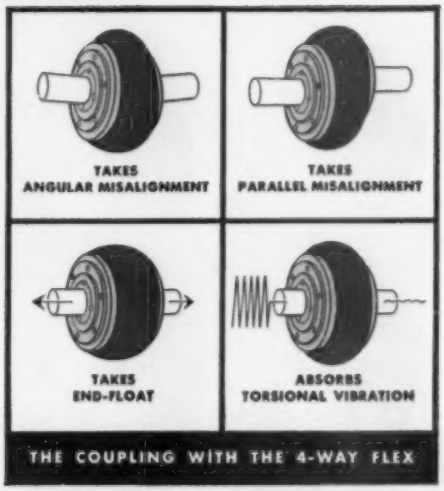
108—Circuit Card Handler inserts or removes expensive cards or printed circuit boards in seconds without distorting them. "Pul-E-Ze" adjusts for various board thicknesses. Pulls up to 70 lb.; fingertip release. Short-circuit and shock-resistant. *Products for Industry.*

Turn the page



NEW!

DIFFERENT!



DODGE

Para-flex

FLEXIBLE CUSHION COUPLING

THIS coupling "swallows up" shaft misplacements. It automatically compensates for end-float, parallel misalignment, angular misalignment *or any combination of all three.* Moreover, it cushions the stresses of shock loads. And it absorbs torsional vibration—reducing noise and protecting machinery from vibration's destructive forces.

Here is a new type of performance—made possible by the development of a tire-like flexing element. Synthetic tension members, bonded together in rubber, give this element the stamina and dependability of modern, high-speed, high-load, shock-absorbing truck tires—and the ability to respond magically to all manner of changing shaft conditions.

Para-flex takes minimum space on the shaft. Mounting is simplified through the use of standard Taper-Lock bushings—no reboring, no machining. Safety is promoted by flush design; there are no protruding parts. No lubrication is required, no periodic inspection. And since the flexible member is molded with a transverse split, it can be replaced *without moving either the driver or driven machine.*

Para-flex Couplings are stocked by Dodge Distributors in popular transmission sizes. They are available from factory stock in capacities up to 2000 hp at 1080 rpm. Call your distributor for a coupling to *make your own test.* You'll witness something revolutionary!

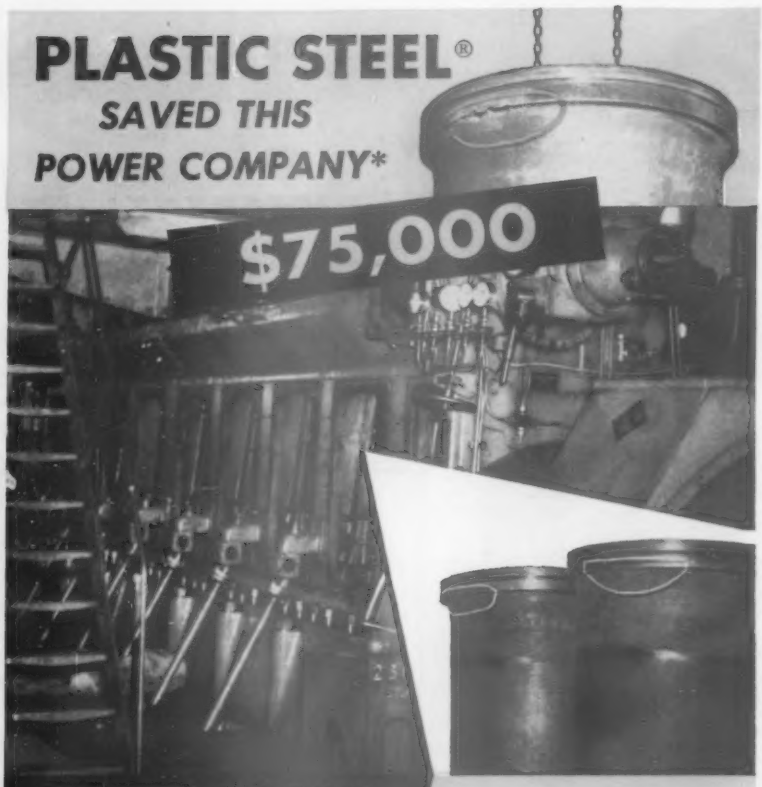
DODGE MANUFACTURING CORPORATION, 400 Union, Mishawaka, Ind.

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

PLASTIC STEEL®
SAVED THIS POWER COMPANY*



THIS DIESEL GENERATOR unit was out of action because the wet sleeve cylinder liners and block were badly corroded.

PLASTIC STEEL® A
(Putty Type)
was applied to the corroded areas, allowed to harden for 2 hours and ground smooth. No heat or welding was required. All of the liners were reinstalled—and now, 2 years later, the unit is performing at peak efficiency. Cost of material—only $10!

**Bahamas Electricity Corp., Nassau, Bahamas*

The strongest, toughest, most versatile repair and tooling material available today!

Plastic Steel, THE ORIGINAL EPOXY REPAIR MATERIAL, and other Devcon products are used by steel mills, chemical plants and many other industries for repairing worn parts, salvaging cracked castings, sealing leaking hydraulic systems and tanks — building up worn pumps and valves — altering cams and gears — repairing fuel and water lines — even under pressure. Approved under Mil. Spec. MIL-C-15202. Bonds iron, steel, aluminum, brass, bronze, wood, ceramic, etc. to itself or each other.

Write today for free case histories of how Plastic Steel and other Devcon products have saved time and money on all kinds of plant maintenance jobs. Our laboratory and engineering staff is available to help with your special problems — no obligation, of course.

DEVCON CORPORATION
65 ENDICOTT STREET, DANVERS, MASS.

TRADE MARK

A COMPLETE LINE OF QUALITY PRODUCTS FOR PERMANENT REPAIRS AND PLASTIC TOOLING.

Order a supply from your local Industrial Distributor today.
Free catalog and engineering reports available on request.

*Plastic Steel is the registered trade mark for Devcon Corporation's metallic molding and filling compound.

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

109—Ident-O-Matic is nameplate press that stamps individual letters and numbers on tags and plates for attaching to property and equipment. Compact machine also marks keys, toolroom tags, personnel badges, storage bin tags; many other uses. *Identification Systems Co.*

110—Interrupting Fuses can handle fault currents to 200,000 amp. Let-through current is held to safe value —holds 500% load for 10 sec. minimum. Protects circuit components against heat, mechanical stress. In 15 to 600 amp., 250 and 600 v. *McGraw-Edison Co.*

111—Electrically Heated Manifold prevents CO_2 regulator freeze-ups while helping to cut gas consumption during welding. Self-contained, one-piece unit works with any set of standard regulators. In various sizes for two- and four-bottle systems. *World Electric Co.*

Turn the page

Thor

Everything you want in Air Grinders . . .

and more!

Thor No. 5 series heavy duty air grinders. Safest grinders ever built. 100% increase in power at no increase in weight. Remove far more metal in far less time. Positive safety control, in addition to standard governor, absolutely prevents "run-away" tools. If governor fails, air supply is cut off. Weight 10 lbs. Grip, lever or butterfly throttle. 4,500 and 6,000 r.p.m. grinding speeds.

Thor has a complete range of air grinder sizes and models. There's a Thor grinder to fit any metal removing or finishing problem. Your Thor factory representative or distributor will demonstrate. Thor Power Tool Company, Aurora, Illinois. Branches in all principal cities.

Thor POWER TOOLS

For more facts Circle 449 on Reader Service Card

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

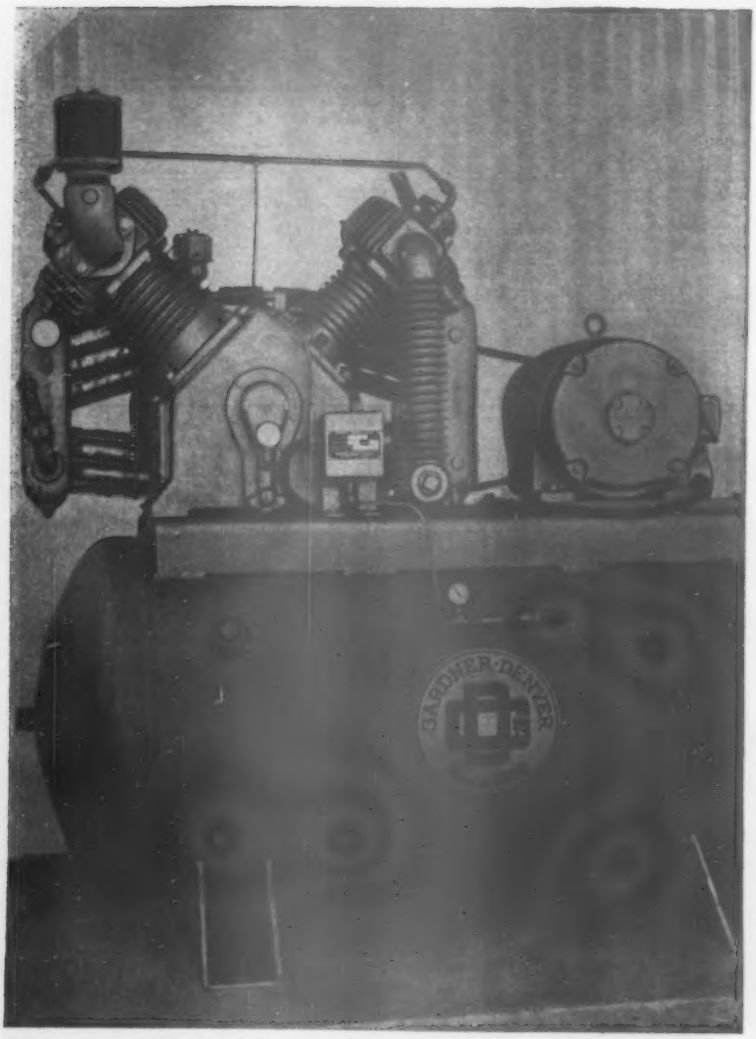
GARDNER-DENVER
Since 1859

GARDNER DENVER

Here's one of the highest-capacity tank-mounted compressor outfits available—to provide low-cost air without adding a more expensive type of installation. It's the Gardner-Denver ADL—a two-stage, air-cooled, 20 hp, two-cylinder unit. In continuous service, it has a piston displacement of 100 cfm at 870 rpm. Discharge pressure up to 125 psi, or as high as 250 psi on intermittent service. Compressor alone also available. For information, write Gardner-Denver Company, Quincy, Illinois.

High-capacity outfit

for low-cost air



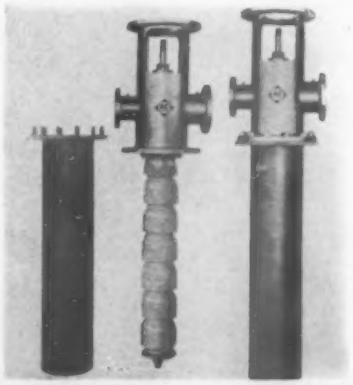
130 For more facts Circle 450 on Reader Service Card

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

112—Finishing Machine, with 4-in. abrasive belt and 12-in. disk, grinds, polishes, and surface-finishes efficiently and economically. For use in shops of all sizes. Particularly applicable for sharpening tools. Also handles wood and plastics. *Rockwell Mfg. Co.*

113—Sliding Motor Base, for variable-speed sheave installations, is ideal in close quarters. Can be moved quickly and easily to shorten center-to-center distance and free V-belts from grooves for sheave adjustment. Comes with 4½-, 6-, or 9-in. slide. *T. B. Wood's Sons Co.*



114—Turbine Pump (assembled, right) consists of vertical pump (center) in tank (left). Handles gasoline, fuel oils, other liquids with vaporizing tendencies. Ready to operate—adapts to automatic control. Heads from 20 to 400 ft.; 20 to 3500 gpm. *Allis-Chalmers Mfg. Co.*

FACTORY/EQUIPMENT NEWS

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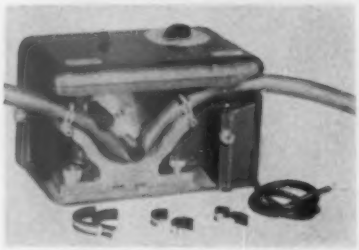
For more about these items, circle item numbers on Reader Service Card next to back cover.



115—Flow Induction Pump uses flexible hose (to 1 in.) on multi-curved track to move liquids, slurries, gases, dried powder, etc. Material never touches metal. Non-jamming, corrosion- and leak-proof. Reversible. Flow varies from few cc. to 500 gph. *Schueler & Co.*

116—Dust-Collecting Bench, with open grating top, permits operator to work from four sides. Eliminates downtime for repositioning. Fan and filter compartment are separate from grating, but connected by 12-in.-high flat duct. Easy to install. *Wolverine Equipment Co.*

117—Electronic Mist Precipitator removes all mist, smoke, and fumes from air exhausted by machine tools, welding booths, etc. Air is recirculated, thus reducing heating and air-conditioning costs. Simple installation. Two models: 600 and 1200 cfm. *Air-Maze Corp.*

Turn to page 134

WORK HORSE... RACE HORSE

Gardner-Denver piston and rotary air hoists

Only Gardner-Denver offers lightweight overhead air hoists for *both* the "work horse" and "race horse" jobs. Axial-piston hoists provide rugged, dependable operation with the control demanded for precise spotting. That's why hundreds of industrial plants rely on this Gardner-Denver hoist. New rotary air hoists are designed for use where the combination of speed and ruggedness is of primary importance—up to 90 fpm in 500-lb. capacity.

Popular models available from 150-4000 lb. Sparkproof construction and pendent control available.

PISTON HOISTS				ROTARY HOISTS			
MODEL	CAPACITY	SPEED	WEIGHT	MODEL	CAPACITY	SPEED	WEIGHT
86-1V10	1000	19	28	86R-5	500	90	27
86-2V20	2000	19	78	86R-10	1000	40	27
86-2V40	4000	10	100	86R-20	2000	20	30

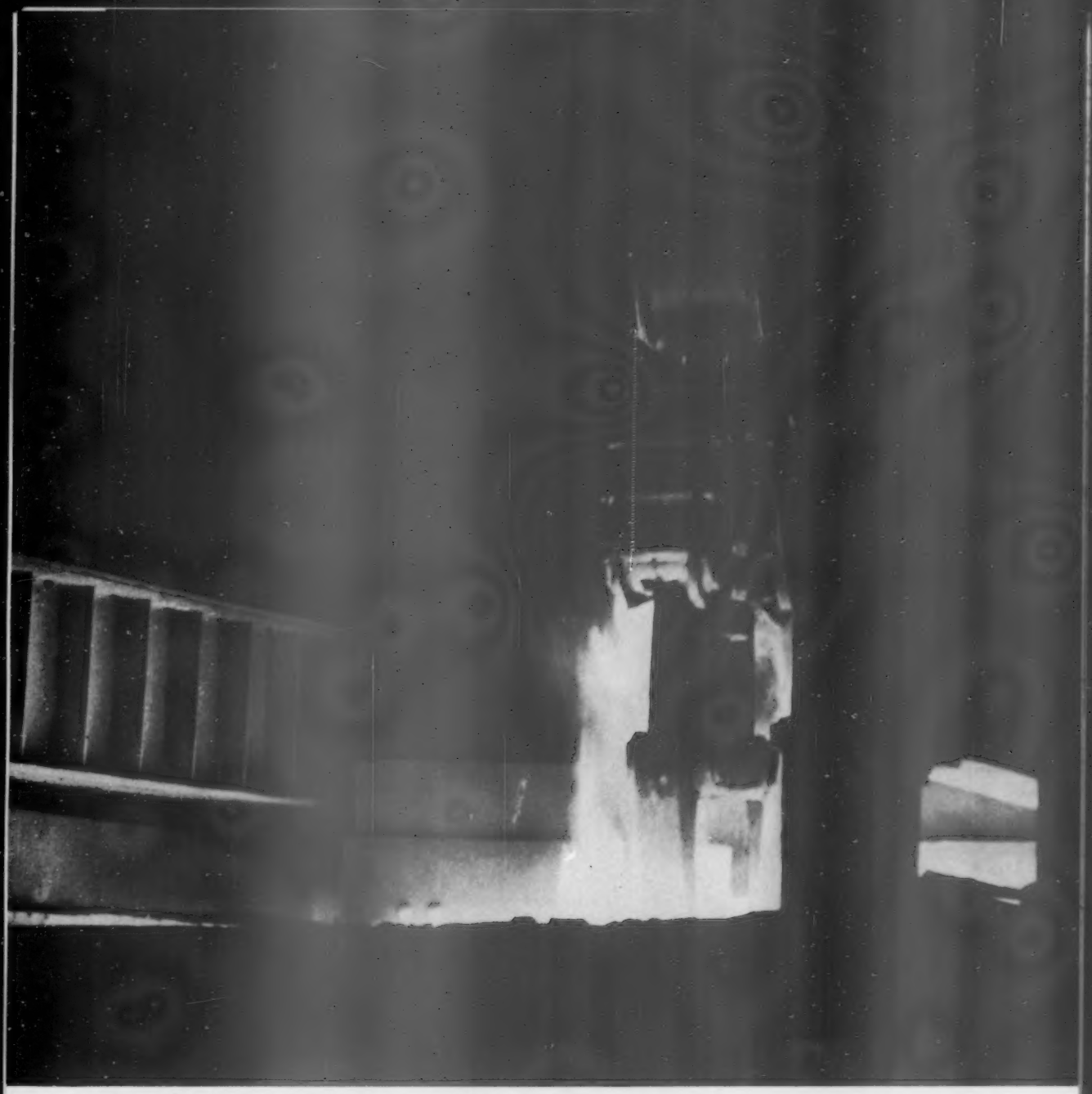
EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

For more facts Circle 451 on Reader Service Card



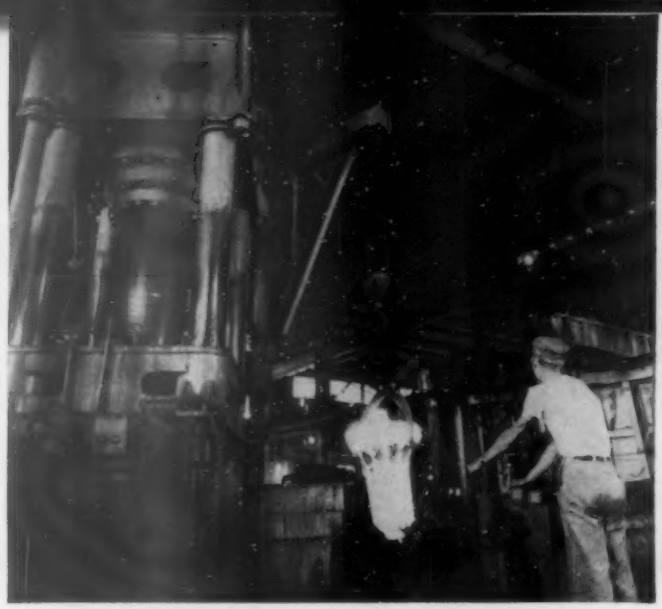
Bearing life increased at least two and one-half times with Gulfcrown Grease E.P. on Green River Steel soaking pit covers.

Gains 36% more production, saves $5,000 a week, by

GULF MAKES THINGS

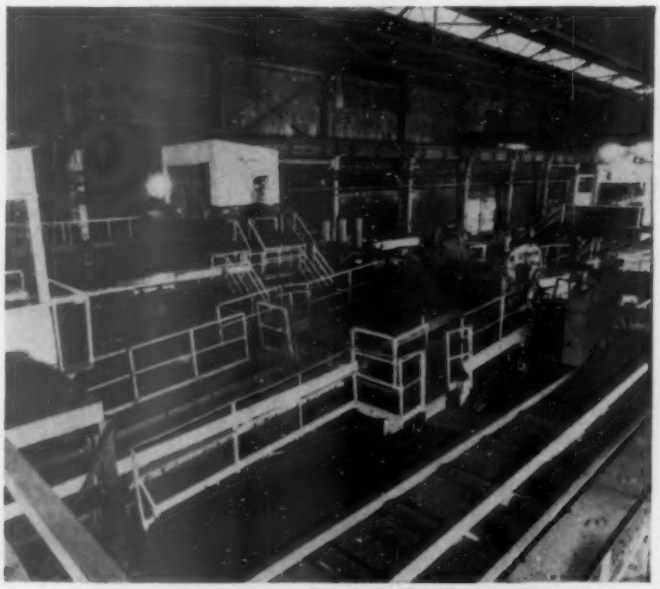
"We've discovered what important savings can be made by simply changing from one grease to another," says Henry J. Werner, Maintenance Superintendent, Green River Steel Corporation, Owensboro, Kentucky. "We were having trouble with the bearings on our soaking pit covers. The grease kept melting out. This meant shutting down the pits, at a downtime cost of $650 an hour. When they're down, we're not pressing steel."

Gulf engineers recommended Gulfcrown Grease E.P., a multi-purpose lithium base grease formulated for unusually heavy bearing loads and high temperatures. "Now," Mr. Werner says, "we have not changed a bearing in the ten weeks the new grease has been in use. We used to replace each bearing every four weeks. Downtime has been cut from 12 hours a week to 4, a weekly savings of $5,000. This has resulted in an increase of our average



Gulf Harmony oil protects against rust and foam in hydraulic systems of Green River's forging presses.

Manipulator, lubricated with Gulfcrown Grease E.P., places billet in forging press.



Longer gear and bearing life on Green River's blooming mill, intermediate and finishing stands is assured by the use of Gulf E.P. lubricants.

Left to right, Marshall Ringo, Gulf Sales Representative, Thomas J. Bartlett, Jr., Gulf Owensboro Distributor, Nelson C. Walker, Executive Assistant to the President, Green River Steel Corp., and George Carney, Gulf District Manager.

switch to Gulfcrown® Grease E.P.

RUN BETTER!

production of 36%, or 702 tons a week."

Based on this experience, Green River plans to standardize on Gulfcrown Grease E.P. for grease applications. To protect against rust and foam in hydraulic systems throughout the mill, Gulf Harmony® oil is used.

Perhaps a Gulf Sales Engineer can help you improve your lubricating practice, and help you make sizeable dollar savings. Just call the nearest Gulf office.

GULF OIL CORPORATION
Department DM, Gulf Building
Pittsburgh 30, Pennsylvania

GULF

For more facts Circle 452 on Reader Service Card

It's super strong!

It's soft on hands . . . but don't let its luxury touch fool you!

DISCOVER WHY NIBROC® IS THE BUY!

NIBROC can take it!

Drinks up water in seconds!

One towel does the job —saves money!

Never falls apart!

Make everybody happy! Give 'em NIBROC . . . the most satisfying paper towel you can put your hands on!

Choose from the complete line of NIBROC Quality towels . . . multi-fold, single fold or C-fold in natural, or the super white embossed line—packed in convenient Zip-Top cartons. Write Dept. FO6, Boston, for samples . . . or look under "Paper Towels" in Yellow Pages for name of nearest distributor.

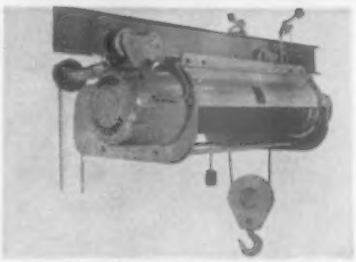
Another Quality Product of BROWN COMPANY

General Sales Offices: 150 Causeway Street, Boston 14, Mass.

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.



118—Geared Trolley Hoist, 12,000-lb. capacity, has 115-ft. lift and 20-fpm. lifting speed. Negotiates a 7-ft. radius curve. Heavy-duty hoist has solenoid-operated brake especially effective for load spotting. Pushbutton magnetic controls. *American Chain & Cable Co.*

119—Meter-Relay Control Kit has all parts needed for complete control. Adjustable pointer on continuous-reading meter-relay sets signal limit. Indicating pointer trips toggle contact. Wide range of milliammeter, voltmeter ratings, both a-c, d-c. *Assembly Products, Inc.*

120—Micrometer Head has 2-in. range for applications requiring long spindle travel. Easily attaches to special gages and fixtures, machine tools, and other equipment where accuracy is needed. Easy-to-read, jet-black markings in 1/1000-in. increments. *Lufkin Rule Co.*

121—Transducer, made of lead zirconate titanate, has stainless steel housing replaceable at about 20% of unit's initial cost. Highly efficient, it operates at 25 kc. Uses small, low-cost power source. About 3 in. high, 2 in. diameter. *Branson Ultrasonic Corp.*

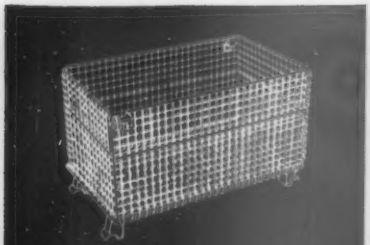
Turn the page

...when it comes to corrosion.

Start by using Allied Chemical 34Yc Cold Coating #134 and Cold Tar Paint #110. Both items offer high-quality, low-cost protection against metal and masonry corrosion. 34Yc is excellent for all surfaces exposed to highly corrosive conditions, extreme moisture, or acid and alkali fumes. It's also an ideal coating for tanks, pilings, structural steel, underground pipes and units. Coal Tar #110 is preferred for outdoor frames and posts, safety and sprinkler piping, transmission towers, general railroad work. If your industrial distributor is not currently stocking these products, write to Industrial Tar Products Department.

PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.

Allied Chemical



MODEL 3220—32" long by 20" wide and 16" high. 1¼" square mesh openings; 4 fabricated steel, safe-stacking legs, loss-proof locks, fire-baked Aluminum finish. Weighs 38 pounds, has 500 pound capacity.

FOLD-DOWN FEATURE—Both Model 3220 and 3220SGC fold down quickly and easily to save over 75% of the open area. This feature saves storage space, makes handling easier and lowers return shipping costs.

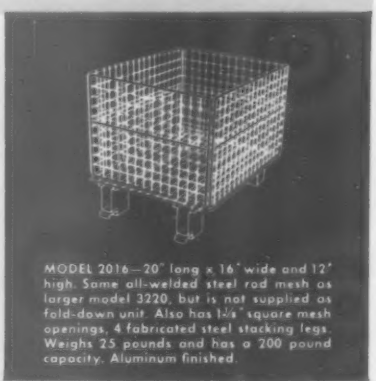
And now... the new 'JUNIOR' PALLETAINERS®

The new 'Junior' Palletainer models are sturdy, close-meshed, all-steel containers designed for more efficient handling, storage, protection and safe transit of *any* small parts. Ruggedly built of reinforced, welded steel rod mesh, the 'Juniors' incorporate many of the outstanding construction and convenience features found only on the larger, heavy duty Palletainers.

Check your plant today—see how many places the 'Juniors' could smooth production, speed processing and save valuable handling time.

SPECIAL OFFER . . . Try these tested, proved-in-service containers on a 60-day memo billing basis. Your obligation is freight, only. Do it today!

MODEL 3220SGC WITH SIDE GATE—Dimensions of the model 3220SGC are the same as those of the regular 3220 model except that this unit is equipped with a hinged, Type "C" side gate for quick, easy access. Use of side gate does not affect stackability or safety.



MODEL 2016—20" long x 16" wide and 12" high. Same all-welded steel rod mesh as larger model 3220, but is not supplied as fold-down unit. Also has 1½" square mesh openings, 4 fabricated steel stacking legs. Weighs 25 pounds and has a 200 pound capacity. Aluminum finished.

USP

UNION STEEL PRODUCTS CO.

616 N. BERRIEN STREET

ALBION, MICHIGAN

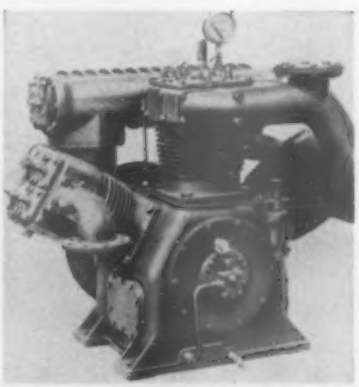
FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

122—Drum-Handler Attachment fits over lift-truck forks as quickly and easily as picking up standard pallet. Frees truck for other material-handling operations. Manually operated hoist tips drum. Pouring height, 103 in.; capacity, 800 lb. *Specialty Machinery Corp.*

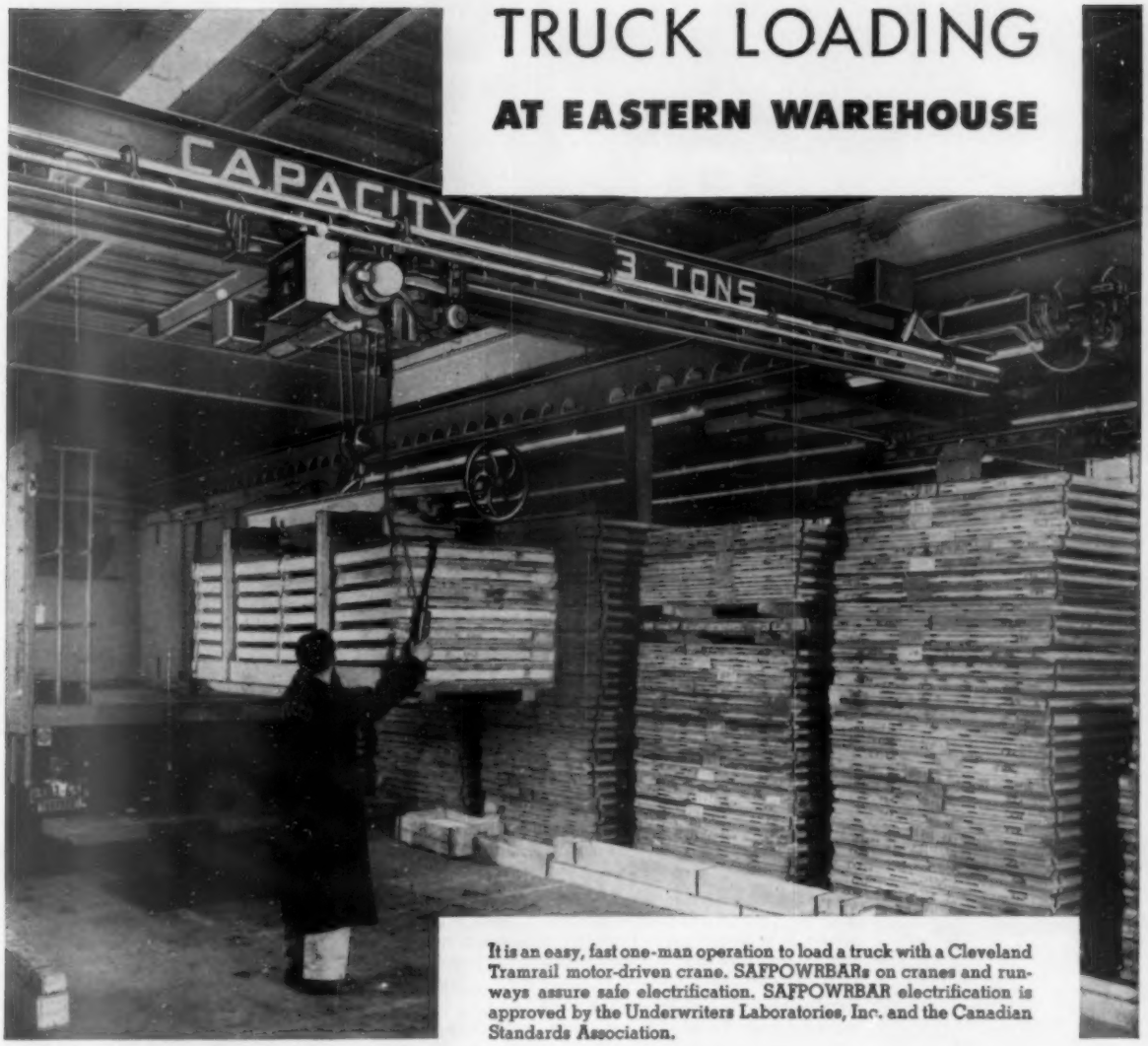
123—Timer records stop-and-go operations of equipment on tamperproof chart. Two models: Electrical monitors up to four machines at once; mounts directly or remotely on equipment. Mechanical records up to 8 days. *Argo Instruments Corp.*



124—Air Compressors may be permanently installed or operated as skid-mount machines. Designed for heavy-duty, three-shift operation, compressors deliver from 174 to 338 cfm. at pressures to 125 psi. Air-cooled cylinders and heads; no condensation. *Atlas Copco.*

Turn the page

TRAMRAIL CRANES SPEED TRUCK LOADING AT EASTERN WAREHOUSE



It is an easy, fast one-man operation to load a truck with a Cleveland Tramrail motor-driven crane. SAFPOWRBARs on cranes and runways assure safe electrification. SAFPOWRBAR electrification is approved by the Underwriters Laboratories, Inc. and the Canadian Standards Association.

Two 3-ton completely motorized Cleveland Tramrail cranes keep materials on the move in a 400 x 400 foot one-story warehouse of T. E. Conklin Brass & Copper Co., Brooklyn, N. Y.

Two aisleways extending from front to rear of the building allow trucks to pass through. This arrangement permits loading and unloading the trucks close to the storage space and eliminates considerable handling. Another desirable feature is that the Tramrail cranes are high enough to clear over the trucks. This allows the loading of two trucks in each aisleway simultaneously without any interference of one with the other.

The Cleveland Tramrail cranes enable piling the materials higher and thereby increase the effective storage capacity per square foot of floor area.

Conklin stocks 3000 items, which are supplied to users throughout the New York area.

Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3246 E. 290 ST. • WICKLIFFE, OHIO

NEW TENNANT MODEL 53 glides down narrow aisles at speeds to 5 mph; sweeps an extra-clean path

How to sweep congested areas extra-clean . . . at 67% less cost

Fast-working Tennant Model 53 can now power sweep your plant at ⅔ less cost than by costly hand methods *. . . even in congested areas where you never would have thought a rider-type sweeper could go!*

Only 42" wide with side-brush, the "53" sweeps a block-long 40" path in less than a minute . . . sweeps *extra-clean* in a single pass. Powerful brush-and-vacuum system gets dirt that pushbrooms miss . . . even sucks dust from cracks!

Handles easily in narrow aisles, on ramps and in congested areas. Trim and compact . . . turns in a 5' radius. Sweeps flush with walls and pallets. In gas and LP-gas models.

Write today *for illustrated bulletin. G. H. Tennant Co., 705G N. Lilac Drive, Minneapolis 22, Minn.*

OUR 90th YEAR

TENNANT

Industry's Most Widely Used

POWER SWEEPERS

Model 100 Sweeper cleans 7'4" path

Model 80 Sweeper cleans 53" path

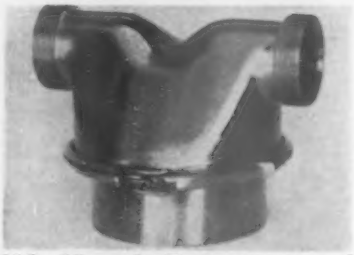
Model 40 Sweeper cleans 34" path

SPECIALIZED MAINTENANCE EQUIPMENT

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

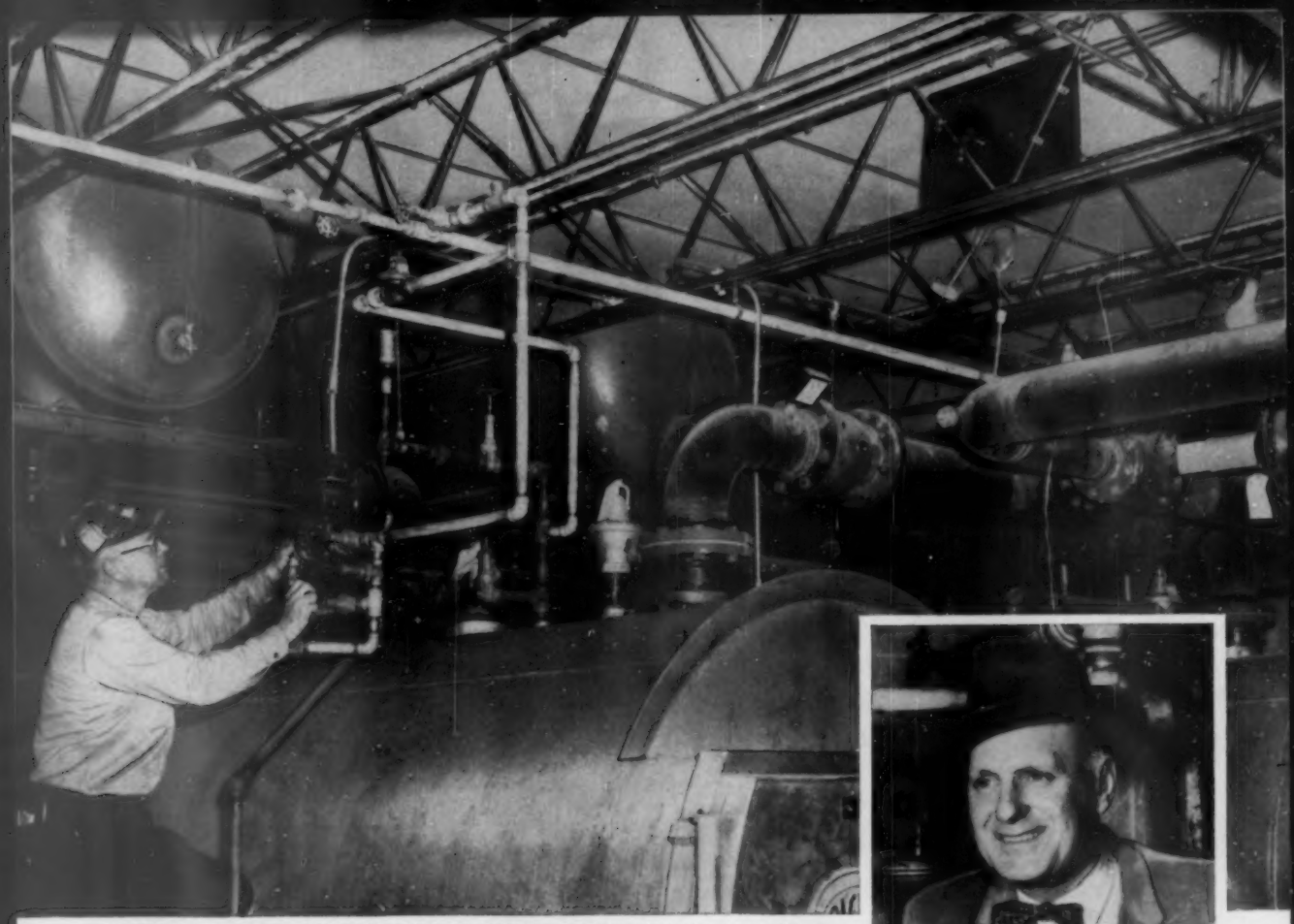


125—Magnetic Trap attracts and removes tramp iron from liquids and slurries in fluid lines without obstructing flow. Quick-release clamp permits detaching base plate in seconds for fast maintenance. In four sizes from 1½- to 3-in. diameter, low-pressure operation. *Cesco.*

126—"O" Ring Service Kit stores, in shatterproof plastic case, up to 305 rings in sizes to fill most replacement needs. Compact, no-mix case uses nesting technique of seal-loaded spindles as integral part of lid. Sizes are marked on each ring-well. *Federal-Mogul Service.*

127—Washing Machine, for inter-process cleaning, handles from 300 to 1500 lb. of small stamped and forged parts per hour. Vertical (11 ft.) conveyor occupies only 16 sq. ft. of floor space. It discharges at or near ceiling level or on floor above. *Ransohoff, Inc.*

Turn the page



Final check is made on Spang Steel Pipe installation in Castle High School heating system. Uniform Spang Pipe was easy to work with, will provide a trouble-free installation.

"SPANG® is tops... they don't make any better steel pipe than that!"

says Mr. Jack C. Gottman, Jack C. Gottman & Co., Evansville, Indiana

"We always use 'good' pipe in our installations, and usually it's Spang," reports Mr. Gottman. "That's why we used Spang Steel Pipe in the heating system at Castle High School, Paradise, Indiana.

"Spang Steel Pipe is uniformly straight and true. It has a good galvanized finish that doesn't chip or peel in bending, and it threads nicely. It makes a good appearance in exposed locations, too. We expect Spang will give good service at Castle High for the lifetime of the school."

Quality control makes Spang tops in performance, dependability

Close manufacturing control from skelp through inspection builds into Spang Steel Pipe all those qualities you want on any job: uniformity of diameter, wall thickness and threads; straightness, clean interior, good finish, easy workability—and most of all—durability for long service life.

See your local Spang Distributor for good service on your next order. Remember: make it steel pipe . . . make it Spang Steel Pipe . . . made in USA.

Architect: Lester W. Routt & Associates, Vincennes, Ind.
General Contractor: Peyronnin Construction Company, Evansville, Ind.
Mechanical Contractor: Jack C. Gottman & Co., Evansville, Ind.
Spang Distributor: Plumbing & Industrial Supply Co., Inc., Evansville, Ind.

SPANG CW STEEL PIPE

THE NATIONAL SUPPLY COMPANY

Two Gateway Center, Pittsburgh 22, Pennsylvania

Subsidiary of Armco Steel Corporation

ARMCO

For more facts Circle 458 on Reader Service Card

SERIES "23" "LOCKWELD" double ball race casters. Sizes 3-8 inches. Matching rigids available.

? ALL CASTERS ALIKE?

SERIES "21" "LOCKWELD" single ball race casters. Sizes 2-6 inches.

Fairbanks "LOCKWELD" Steel Swivel Casters are the different casters—the casters without a king-pin—the casters without the major cause of caster failures. The unique "LOCKWELD" Construction will cut your maintenance and replacement costs—bring big savings to you.

Fairbanks patented "LOCKWELD" Steel Casters — in single ball race, regular duty, and double ball race, medium-heavy duty construction — have substituted a rugged welded structure for the king-pin assembly. Inherently stronger, and locking the ball raceways in rigid alignment, this construction provides casters that last longer, swivel easier, and end your swivel caster maintenance problems.

Another patented feature of Fairbanks "LOCKWELD" Steel Casters is the spherical leg design. Based on the stress dispersing qualities of a true sphere, this leg design disperses shocks and overloads over a greater portion of the ball race, providing for easier swiveling under load and materially increasing the strength and service life of the casters.

Buy Through Distributors. Fairbanks products are stocked, sold and recommended by leading distributors in all the principal cities across the nation.

THE **Fairbanks** COMPANY

Executive Office: 393 Lafayette St., New York 3, N. Y.
Valves • Dart Unions • Casters • Trucks • Wheels
520 Atlantic Ave., Boston 10, Mass.
2600 S. Throop St., Chicago 8, Ill.
393 Lafayette St., New York 3, N. Y.
15 Stanwix St., Pittsburgh 22, Pa.
202 Division St., Rome, Ga.
Factories — Binghamton, N. Y. and Rome, Ga.

These exclusive "LOCKWELD" Casters are part of the Fairbanks line of industrial casters and wheels which includes heavy duty, completely hardened, steel casters; trailer casters and semi-steel casters; Fairbanks guaranteed vulcanized rubber tired wheels; Fairbanks "LAMILON" All-Plastic (patent pending) wheels and solid rubber and semi-steel wheels.

SERIES "27"

Heavy Duty, completely hardened casters, sizes 6, 8 and 10 inch.

SERIES "500"

Guaranteed Vulcanized Rubber Tired Wheels, sizes 3-18 inches.

SERIES "700"

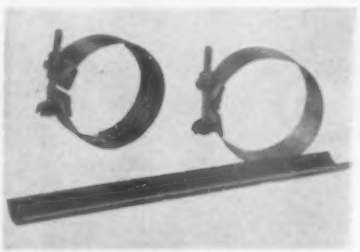
"LAMILON" All-Plastic (patent pending) Wheels, sizes 3-12 inches.

FACTORY / EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

128—Mechanical Carton Former receives new, folded corrugated case, opens and forms it, positions it over funnel of packer. Filled case discharges automatically to gluer and compression unit. Handles up to 40 cases per min. *Crompton & Knowles Packaging Corp.*



129—Clamp and Gasket combination can make repairs on leaking pipes of any length in multiples of 3 in., up to 30 in. Need for only one clamp width (3 in.) and gasket strip reduces repair clamp inventory. Gaskets: 18 in. long, 1¼ and 3 in. wide. *Smith-Blair, Inc.*

130—A-C Contactor, insulated for maximum of 600 v., is about half the size of maker's former unit. Designed for continuous duty, contactor-operated at 85 to 110% of rated coil voltage. In 2- or 3-pole, front- or rear-connected assemblies. *Westinghouse Electric Corp.*

Turn to page 144

For more facts Circle 459 on Reader Service Card

For more facts Circle 460 on Reader Service Card ➤

GET FAST COOL *Cutting Action!*

BUY SIOUX SANDERS AND ABRASIVE DISCS

NEW Air Driven Flat Sander

Exclusive design features include a remote exhaust system which carries exhausting air and lubricant away from the work and the operator; a palm switch paddle for convenient, comfortable one hand control; and the efficient SIOUX mechanical design which requires up to 30% less air for the same amount of work. Oscillating orbital action produces a superior finish; for wet or dry sanding. It's powerful, light, and perfectly balanced for feather edging.

Powerfully Dependable

SIOUX HIGH SPEED H. D. SANDERS

SMOOTH, powerful SIOUX Sanders operate with cost cutting speed and ease. They're designed with stamina and dependability for the most punishing use. Heat treated gears, and permanently lubricated bearings help assure long, trouble-free life. They're the best buy in the long run.

SIOUX ABRASIVE DISCS *cut fast, run cool!*

INDUSTRIAL—As compared with regular discs SIOUX Industrial Discs have 31% more fibre shear strength to keep the disc from flying apart under severe use; 39% more grain to provide more cutting points; and 49% more resin to securely bond the extra grain.

REGULAR—Regular discs are intended for work on light gauge metal where heat generated by heavier type might cause warpage or metal expansion. Resin bond tempered aluminum oxide grain is used on Regular and all SIOUX discs for maximum cutting action.

OPEN COAT—Open coated discs are intended for paint removal, and for cooler grinding on curved, or recessed surfaces. They are recommended for use anywhere an abrasive is needed that should not load or clog.

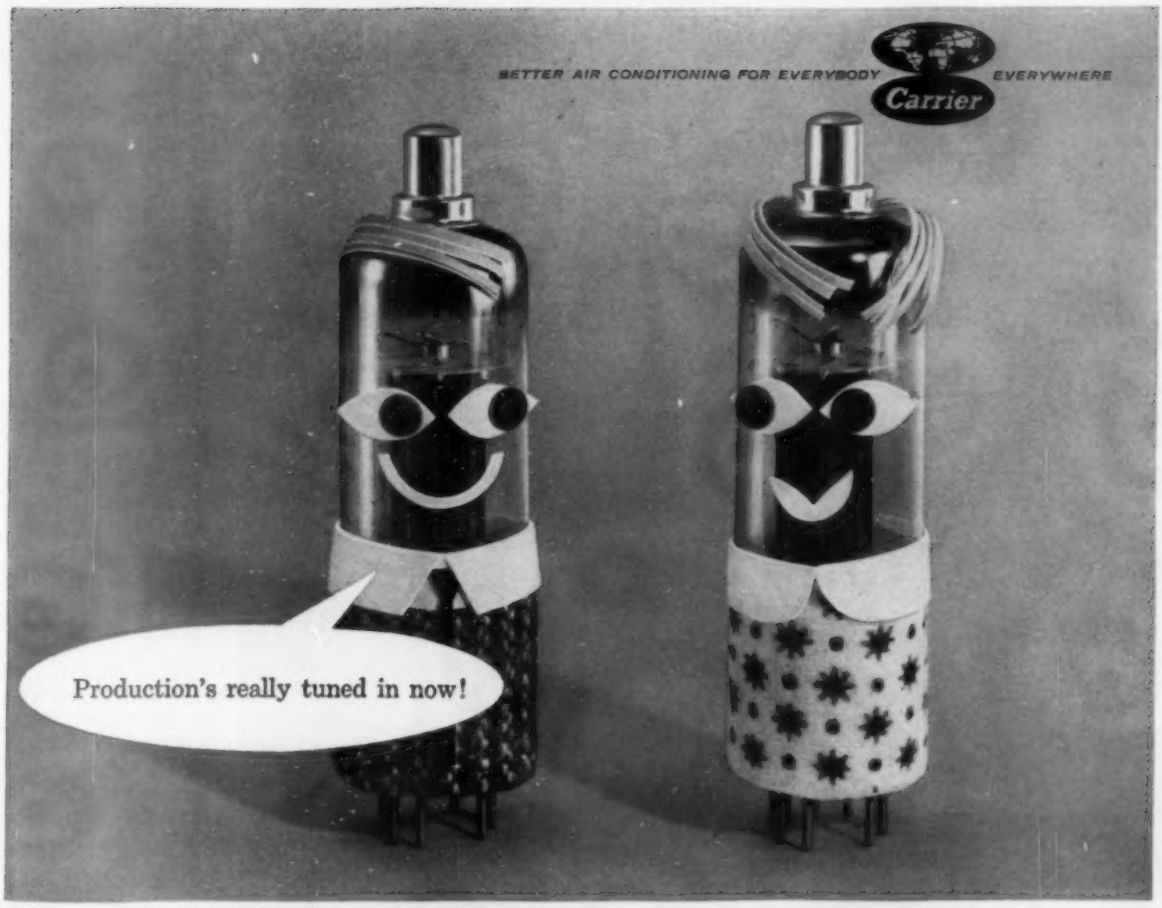
GRIND-A-LITE—The new Grind-A-Lite disc is intended for general sanding operations on light gauge metal. It is light, flexible and excellent for use on contoured surfaces. It cuts sharper, runs cooler, loads less, and lasts longer than most other discs.

Find Your Nearest SIOUX Distributor in the Yellow Pages
Under "Tools, Electric"

ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.

AIR IMPACT WRENCHES • AIR SCREWDRIVERS • ELECTRIC IMPACT WRENCHES • DRILLS • SCREWDRIVERS • GRINDERS • SANDERS • POLISHERS • FLEXIBLE SHAFTS • PORTABLE SAWS • VALVE GRINDING MACHINES • ABRASIVE DISCS.



SYLVANIA EARNS 30% ANNUAL RETURN ON CARRIER AIR CONDITIONING INVESTMENT

That air conditioning provides the proper climate for industrial processes is no longer questioned. Hundreds of products could not be mass-produced without the control of temperature, humidity and air cleanliness which year-round air conditioning provides.

But is air conditioning for workers as important as it is for products? Can the benefits be as accurately measured on production reports and profit-and-loss statements?

One of many manufacturing companies able to answer these questions with authority is Sylvania Electric Products, Inc.—a leading producer of electronic equipment, whose $2,600,000 worth of Carrier air conditioning is paying handsome dividends.

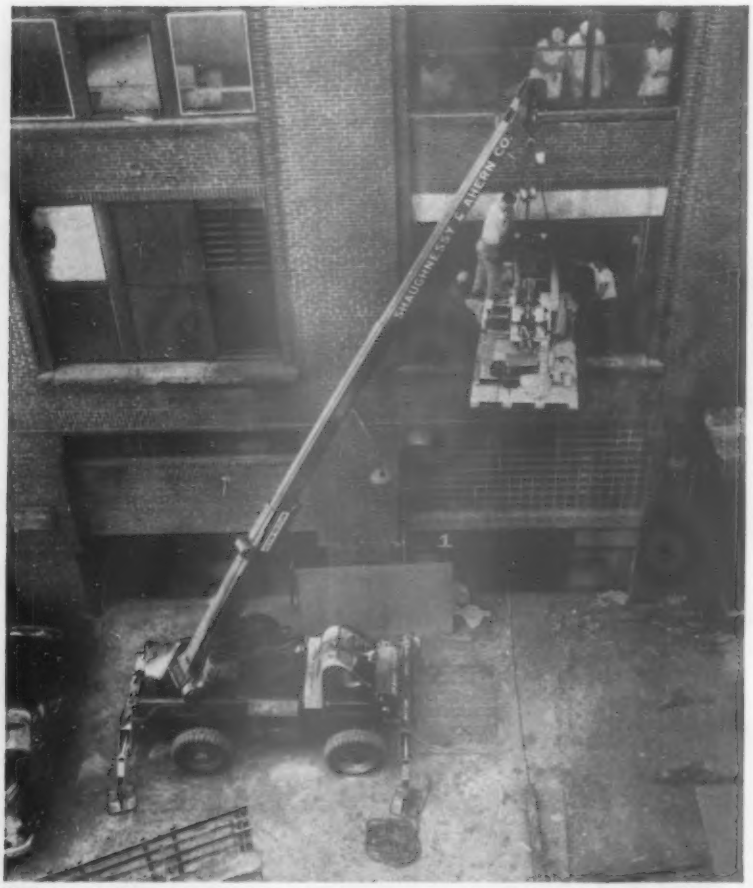
The company has installed Carrier air conditioning in fifteen of its plants over the past four years. What has happened in one of them—the Altoona, Pa. radio tube plant—illustrates how air conditioning is paying off.

Productivity in this plant increased 5% during five summer months. Annual absenteeism dropped 20%. And increased work output is giving the company a yearly return of 30% on its air conditioning investment—to say nothing of 80% less spoilage due to air contamination and 20% less downtime on sensitive production machines.

Many other manufacturers report similar figures and it is significant that neither the geographical location of their plants nor the type of products manufactured affects the size of their gains. What does determine the profitability of air conditioning, in almost all cases, is the density of workers in a given plant or plant area.

Where the number of workers in relation to the space in which they work is high, the return on the air conditioning investment is high. For this reason, the most densely populated departments should be air conditioned first in any program calling for the installation of complete plant air conditioning over a period of years.

There are other yardsticks, too — all described in the booklet, "Will factory air conditioning pay off for me?" which we will send you without obligation. Write for it today, then make your decision. Carrier Corporation, Syracuse, New York. In Canada: Carrier Engineering Ltd., Toronto.



Model 210 A-W Hydraulic Crane hoists 5600-lb. packaging machine to second story of Boston bakery.

A-W crane doubles riggers' capacity!

"Our Austin-Western hydraulic crane serves two or three rigging crews daily, 6 days a week, in different parts of the city. It has plenty of speed and mobility for heavy traffic. Our records show that it actually doubles the work capacity of our crews. Customers like it too. They often request it because it works faster and more efficiently and as a result costs them less hourly rental.

Fantastically low maintenance

"The A-W is versatile. It frequently does jobs which used to take a heavier crane renting for $150 a day. Maintenance costs have been fantastically low. Downtime near zero. It's an easy-to-operate piece of precision equipment; tops for dependability and performance. Only one man is required to operate this crane. I don't see how we could do business without it any more"—*Jack Shaughnessy, Shaughnessy and Ahern, Boston machinery movers and riggers.*

To lift, carry or place

Austin-Western now offers a complete line of lift, carry and place equipment in five models with capacity ranges from 5 to 11 tons. Chances are good that an A-W hydraulic crane will save time and money for you in your operations. Why not let us tell you exactly how much you could expect to save with one. Ask your nearby Austin-Western distributor or write us today.

Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

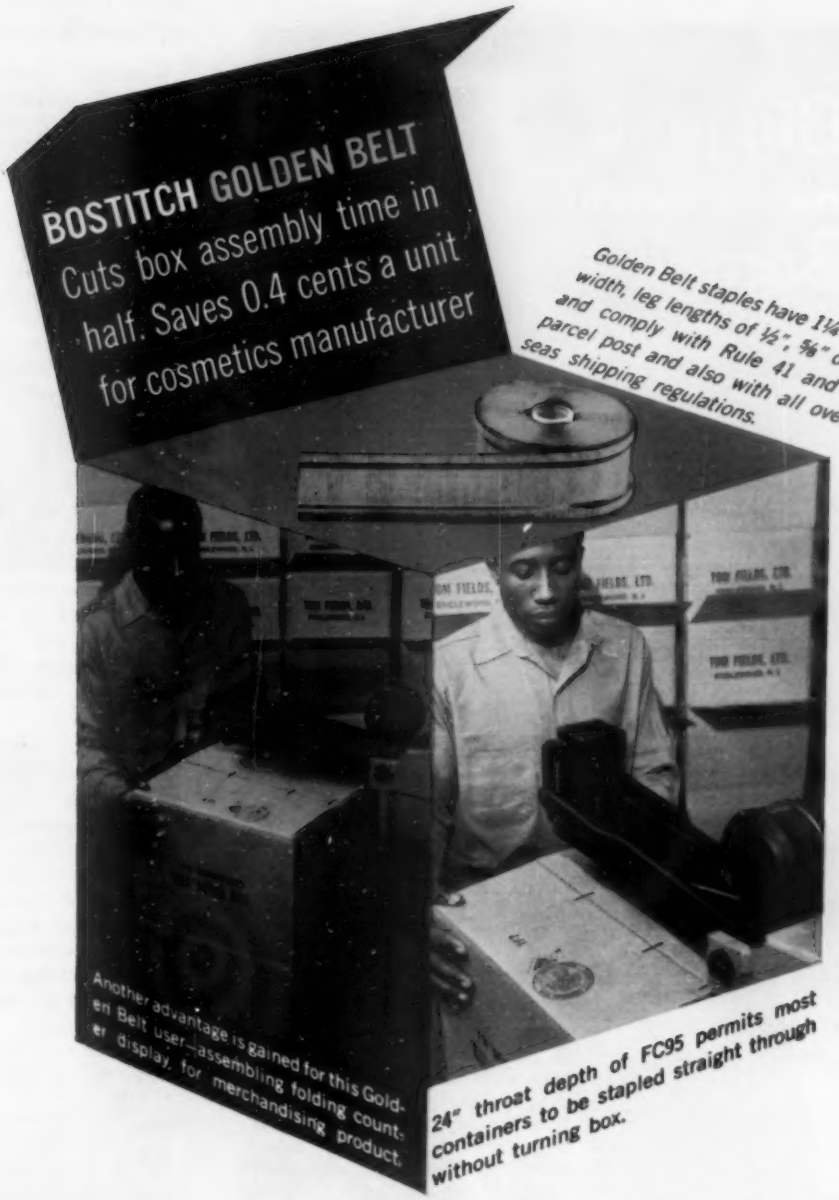
131—Wing Nuts have nylon locking collar to prevent loosening under impact, vibration, or stress reversal anywhere on bolt or stud. Self-locking nut comes in coarse or fine threads, sizes 8, 10, ¼, 5/16 and ⅜. Reduces maintenance. *Elastic Stop Nut Corp. of America.*

132—Lift Table, hydraulic-powered scissor-type, has 24,000-lb. capacity. Extends to 40 in., collapses to 8½ in. Can be easily installed next to machine, or recessed in floor. In various-size platforms, tops for turntables, conveyors, etc. *Southworth Machine Co.*

133—Flexible Couplings are mechanically attached without flare or beads to provide low weight-to-strength ratio. Form no-leak seal under extreme pressure, heat, and vibration for aromatic fuels, Freon 12, etc. In ⅜- to 5-in. sizes, for −70 to +450 F. *Gamah Corp.*

134—Tractor Shovel, for bulk material handling, is 8x15 ft. long, yet turns in radius of only 11 ft. 2 in. Gas-powered by 66.5-hp. engine, it has lift capacity of 5400 lb., dumping height of 8 ft., and travels up to 26 mph., forward or reverse. *Clark Equipment Co.*

Turn the page


BOSTITCH GOLDEN BELT
Cuts box assembly time in half. Saves 0.4 cents a unit for cosmetics manufacturer
Golden Belt staples have 1¼" crown width, leg lengths of ½", ⅝" or ¾", and comply with Rule 41 and all parcel post and also with all overseas shipping regulations.
Another advantage is gained for this Golden Belt user—assembling folding counter display, for merchandising product.
24" throat depth of FC95 permits most containers to be stapled straight through without turning box.

A cosmetics manufacturer found a way to speed package assembly and lower costs when he learned about this fast new method for box bottoming.

The belt on top of the Bostitch Golden Belt Box Bottomer consists of 4000 continuously fed copper-finished, wide-crown staples. This permits bottoming 1000 to 2000 boxes without reloading. The cosmetics manufacturer, mentioned above, fastens most of 28 different sizes of containers with just two staples. Larger sizes require four staples. The entire length of most boxes can be stapled in one straight pass through the machine.

Your packaging and shipping room may provide opportunities where the Bostitch Golden Belt can increase speed and efficiency and lower costs of box bottoming. Have a Bostitch Economy Man show you how a surprisingly low investment will result in more boxes an hour. Find him in your phone book, or drop a line to Bostitch, 606 Briggs Drive, East Greenwich, Rhode Island.

Fasten it better and faster with

BOSTITCH
STAPLERS AND STAPLES

606 Briggs Drive, East Greenwich, Rhode Island

Compact RIDGID 300 Power Drive with Accessories

Portable, Fast and Easy-to-Use, Low Cost. 1/8" to 2" Capacity; Power for up to 12" Geared Tools

Here's such an amazing power package that you'll have to try it to believe it. It's built around the compact, rugged RIDGID 300 Power Drive with famous RIDGID Speed Chuck that grips tight—forward or reverse, yet sets and releases easily by hand. Cam-action rear centering device holds even long lengths centered for perfect threads every time. Sturdy No. 1206 Stand folds for easy carrying . . . is extra rigid when in use.

RIDGID No. 310 Carriage, made of strong aluminum alloy, slides smoothly on drive support arms . . . holds die head and cutter ready for instant use. Snugs up tight to chuck for close threading and cut-off.

RIDGID 535 Quick-Opening Die Head, shown here, threads ½" to 2" pipe with just 2 sets of dies . . . adjusts to size right in machine . . . no fumbling for right size threader . . . no slow back-off. All other RIDGID Machine Pipe and Bolt Die Heads can be used. Add a RIDGID No. 19 Nipple Chuck, and you can thread close nipples.

RIDGID 360 full-floating Cutter has slide action that adjusts to all pipe irregularities . . . wide rolls for straight cuts at machine speed. Capacity: ¼" to 2" pipe and conduit—⅛" rod. E-1032 wheel for 1" rod available.

See and try this time-and-work-saving RIDGID 300 group at your Supply House!

RIDGID

The Ridge Tool Company, Elyria, Ohio, U.S.A.

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

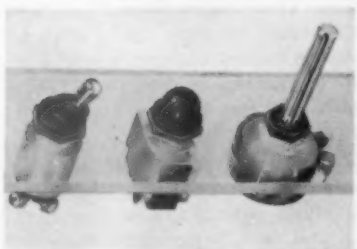
135—Electric Duplicator delivers 300 to 500 sharp copies in one to five colors from single master on any weight paper. Reproduces anything typed, written, drawn, or traced at rate of 120 copies per min. No skipping; even intensity through batch. Price $299. *Ditto, Inc.*

136—Thermostatic Steam Trap eliminates cycling and modulates opening to degree of flow. No bellows fracture means little bellows replacement. High capacity—½-in. size with 0.460-in. orifice handles 17,500-lb. condensate per hr. at 125 psig. *The C. E. Squires Co.*

137—"Packaged" Control Panel automatically starts, stops, and completely supervises combustion of gas-fired ovens, furnaces, etc. Provides low-cost centralized control and safety. Uses standard parts, assemblies. Rated 230 v., 3-phase, 60-cycle. *Production Controls, Inc.*

For more about these items, circle item numbers on Reader Service Card next to back cover.

138—Rod-Tube-Pipe Assemblers permit fast, easy construction of infinite variety of high-strength installations. Units grip all around tubes or piping, not only at tip of fastening screw. Paired toothed faces form rigid joints at 10-deg. increment. *Unistrut Products Co.*



139—High-Pressure Seals, for toggle switches, pushbuttons, and rotating shafts, protect against dirt, dust, fumes, moisture; form vibration-resistant joint. Have operating range of −160 to +500 F. For shafts to ½ in. OD., in seven thread sizes. *Metal Process Co.*

140—Teflon-Lined Hose withstands all known chemicals except fluorine gas, chlorine trifluoride, molten alkali metals. Flexible. Crack- and split-proof. Easy to clean. In diameters to 1¼ in., 15- to 50-ft. lengths, heat to 325 F., 1500 psi. *Raybestos-Manhattan, Inc.*

Turn the page

For more facts Circle 465 on Reader Service Card

learn how

DUO-FAST

Staplers • Tackers • Nailers can save you money

Thousands of industrial plants are finding the cost cutting solution to their fastening problems in the DUO-FAST Line.

Whether it be a nailing job, a problem of stapling corrugated, assembling wood parts, or doing a fastening operation in a hard-to-get-at place—there is a DUO-FAST tool to do the work and save you money in the process.

A trained staff of stapling experts, working out of more than fifty DUO-FAST offices, are eager to assist you. They may be able to cut your production costs.

DUO-FAST Staple Nailing beats hand nailing 5 to 1 on assembling wood frames, expendable skids, making up shipping crates, etc.

DUO-FAST Air Tackers are small, easily portable units that are doing a whale of a production job for a whale of a lot of industrial plants.

If you can't take the work to a stationary stapling device, take the stapler to the work as shown here. The DUO-FAST Air Plier is a fine problem solver.

Many jobs can be speeded with DUO-FAST Gun Tackers and Hammer Tackers like attaching a protective liner to a crate as shown here.

Send for the address of your DUO-FAST representative and a copy of the helpful DUO-FAST Stapler, Tacker, Nailer manual.

FASTENER CORPORATION 3758-66 River Road, Franklin Park, Illinois

0271

DUO-FAST Staplers Tackers Staples

Everything you need for tacking, stapling and nailing.

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

141—Lift Trucks, in a low-cost, power-propelled line, are designed for light- and medium-duty handling. They feature three speeds forward and reverse, 24-v. system, built-in battery charger, sealed gear drive. Lifting heights range from 54 to 130 in. *Crown Controls Co.*

142—Glass Beading Kit contains all equipment needed to score and cut Pyrex piping (to 6 in. diameter), as well as lifetime drain lines for making permanent compression joints. No need to order custom-made sections. Portable for field use. *Corning Glass Works.*

143—Safety Ladder has automatically leveling legs with spring action that adjust to uneven terrain. Added feature is rubber sling attachment that fits over top rail. This grips poles, pipes, other vertical projections to prevent slipping. *Industrial Ladder Co.*

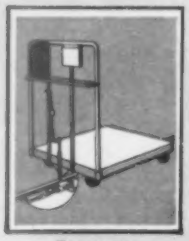
Turn to page 153

EVER MEET THE FAMILY?

Trolley

Power & Free

Automation


Towveyor

The Jervis B. Webb Company is in its 40th year of designing, manufacturing and installing custom engineered conveyor systems. We have also acquired a fine family of diversified industries that complement each other to provide complete customer service.

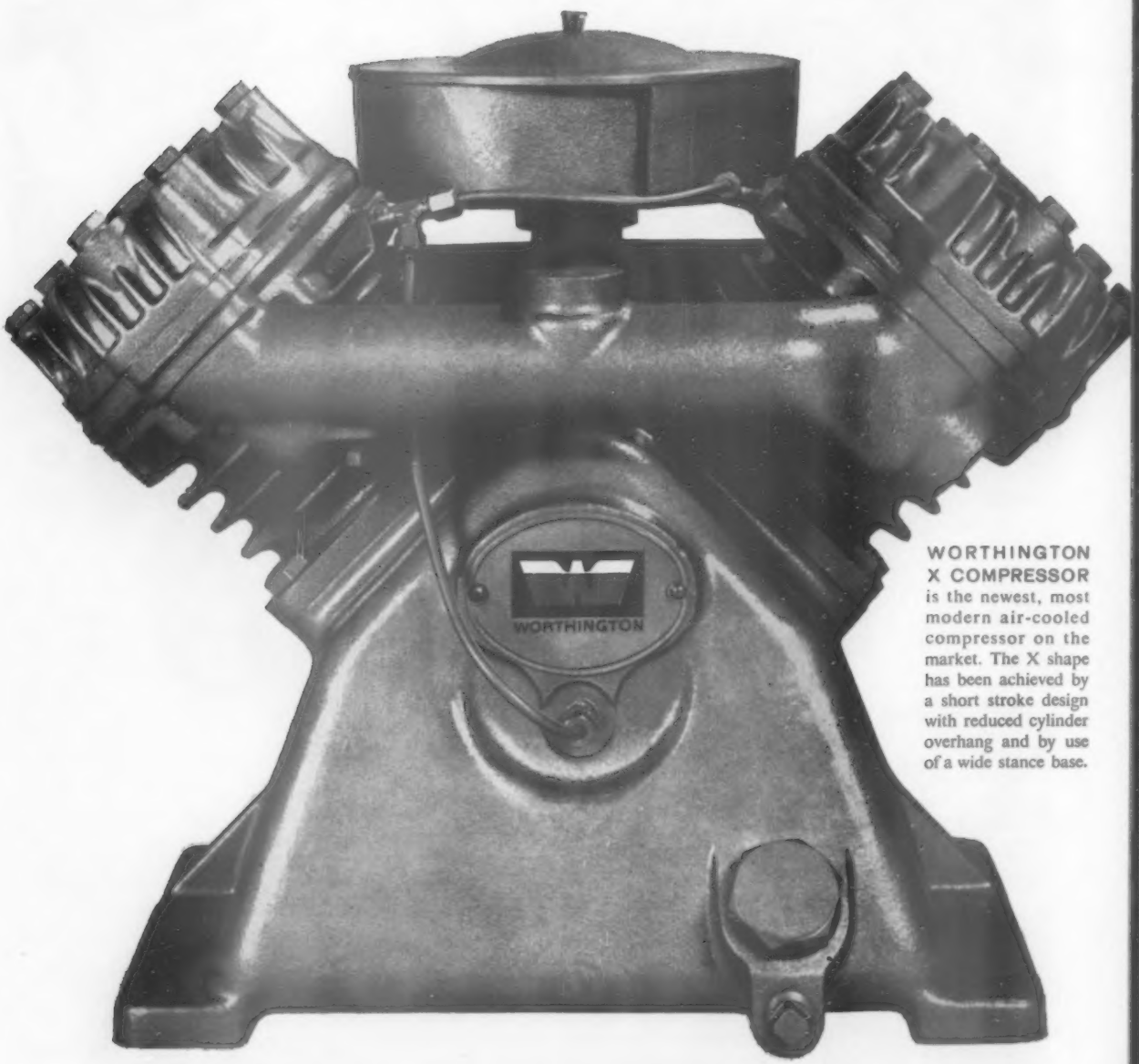
Each member of the family is a separate organization with highly skilled personnel who specialize in designing, manufacturing and installing: cranes and monorail systems; bulk handling systems; universal test equipment; and close tolerance forgings. End products differ, but the prime objective is the same—better production at lower cost.

WEBB

JERVIS B. WEBB COMPANY

8939 ALPINE AVENUE • DETROIT 4, MICHIGAN
SPECIALISTS IN CUSTOM CONVEYOR SYSTEMS

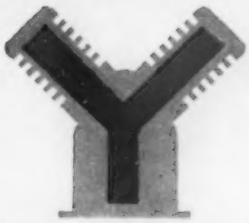
INTRODUCING: THE ALL-NEW



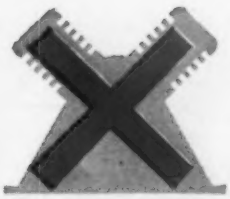
WORTHINGTON X COMPRESSOR is the newest, most modern air-cooled compressor on the market. The X shape has been achieved by a short stroke design with reduced cylinder overhang and by use of a wide stance base.

WORTHINGTON X COMPRESSOR

I-SHAPE compressor is prone to harmful vibration in both horizontal and vertical planes as the two pistons travel up and down in opposite directions. Cooling is also a problem. Only one cylinder is in the direct path of cooling air from the compressor fan and there is about 40% less cooling surface.



Y-SHAPE increases cooling by spreading cylinders. The vibration problem, however, is only partially solved. Pistons operating at 45 degrees to horizontal tend to rotate the compressor When supported by a small, narrow base the unit tends to be unstable and prone to harmful vibration.



X-SHAPE compressor gives excellent cooling plus minimum vibration. The same twisting forces occur as the pistons move back and forth but this compressor with its wide stance base is more stable. As a result, there is less internal strain, and vibration is considerably reduced.

New design reduces vibration—enemy of compressor life

Vibration is the mortal enemy of every reciprocating machine. Sooner or later vibration must exact its toll in the form of wear or failure. Controlling vibration is the secret of building compressors that run longer and quieter with less maintenance.

Our new X compressor was designed to be the most "rock steady" unit on the market. *Vibration is so negligible that we have balanced a coin on an X compressor while it was running.*

The story behind this first air cooled compressor redesign by a major manufacturer in 15 years is interesting.

Our engineers started with a modern short stroke, large bore design. (A typical cylinder has a diameter of 6"; stroke of only 2¾".) This design reduces piston travel and wear, and increases efficiency.

The short cylinders that resulted made it possible to reduce cylinder overhang considerably. Then the width of the base was increased until an X shape was obtained.

Concurrently, the decision was made to operate at higher rotative speeds. This reduced size and weight. The X design is 15% to 20% smaller and lighter than most compressors. The X compressor was designed to operate up to 1750 rpm (versus a top of 900 or so for most other units.) Its short stroke design, however, makes piston speeds very conservative. They never exceed 700 feet per minute.

The new X compressor has many other innovations. Its silicon treated filter element is 99%+ efficient. Its shell-molded, ductile iron crankshaft has better balance and greater strength. Its aluminum connecting rods increase heat conductivity and reduce reciprocating weight. In all, more than 25 separate innovations were incorporated in the design.

The new X compressor is equipped with Worthington's famous Feather* valve. The lightest, fastest-acting valve in the industry, the Feather valve has compiled an outstanding performance record. (A recent survey indicates that operating men prefer them two to one over the next nearest type).

Worthington's New X compressor is available as a bare compressor or base or tank mounted. Standard belt-driven units are available in ratings from ¾ to 15 hp and 40 to 250 psi. Monobloc units from 1½ to 5 hp, 175 psi. For more information, call Worthington distributor listed under "compressors" in yellow pages or mail coupon.

*Reg. Trademark U. S. Pat. Off.

WORTHINGTON

WORTHINGTON CORPORATION
SECTION A
HOLYOKE, MASS.

I'm interested. Send me a copy of Bulletin 3405-B2 describing your new X compressor line.

NAME_____

COMPANY_____

ADDRESS_____

CITY AND STATE_____

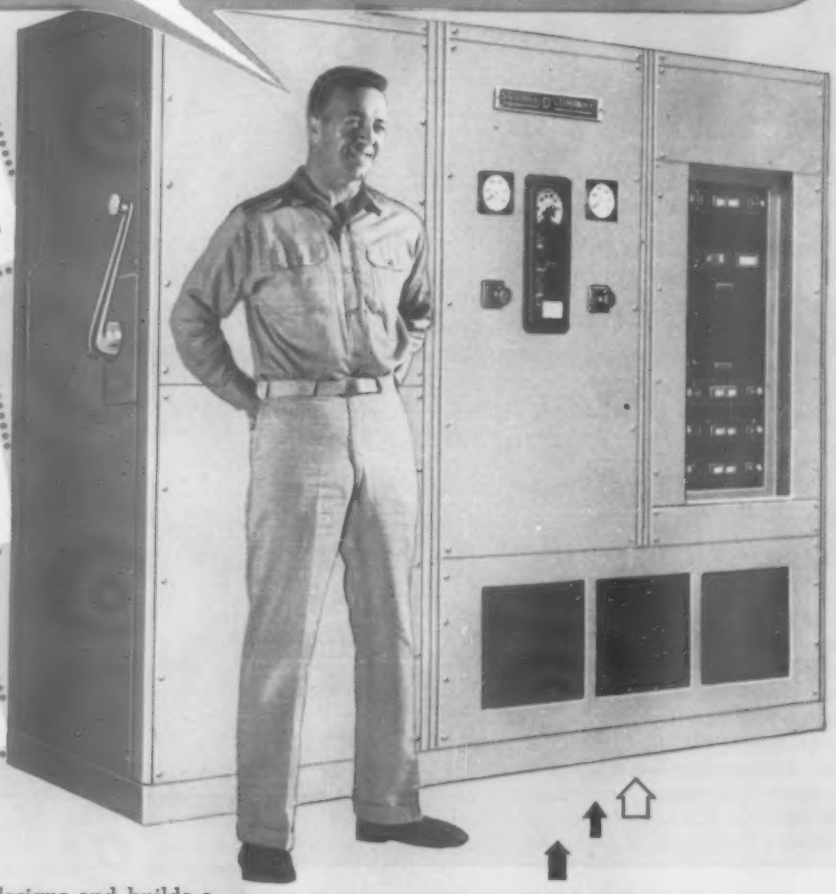
For more facts Circle 468 on Reader Service Card

Power-zOne® UNIT SUBSTATIONS
HAVE EVERYTHING...INCLUDING COMPACTNESS!

Can be moved through normal commercial doorways

Save valuable space —can be placed against the wall

Capacities up to 500 KVA



• Square D designs and builds a complete line of substations for any application, indoor or outdoor—with dry or liquid-filled transformers—with large air-breakers or molded case breakers—with motor control units.

If you have any questions pertaining to substations, call in your Square D Field Engineer or write for literature describing space and cost saving with Square D's "*Power-zone*" design.

Address Square D Company, 1601 Mercer Road, Lexington, Kentucky.

Power-zOne DESIGN PAYS OFF!

MINIMUM SIZE AND EASY HANDLING

- Only 79½" high, 36" deep and 94" wide
- All components front-accessible

EQUIPPED TO BEST FIT YOUR APPLICATION

- **High Voltage** • Air interrupter switch or oil cutouts, fused or unfused
- **Transformer** • Dry type; quiet; up to 500 KVA and up to 5 KV primary; winding taps easily accessible through front grille
- **Low Voltage** • Molded case circuit breakers; QMB fusible switches and motor starters; metering equipment. Full 72" of panel space available for these devices

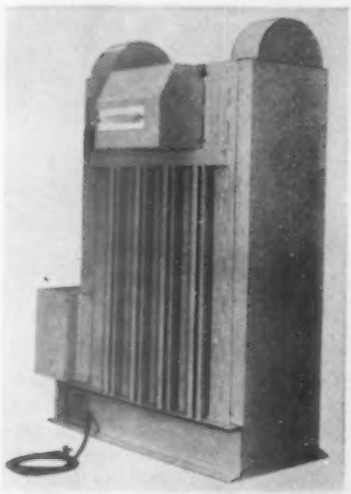
SQUARE D COMPANY

wherever electricity is distributed and controlled

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.



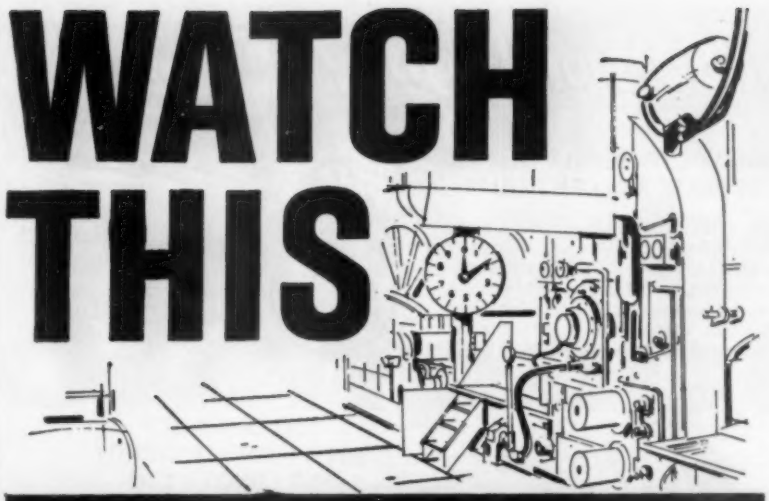
144—Shredder-Baler chops up confidential documents and waste paper, wraps it in packages—all in one operation. Little maintenance, cutters never need re-sharpening. Paper clips and fasteners don't damage. Two models. Smaller (shown) shreds to 100 lb. per hr. *Baler Corp.*

145—Emergency Splint can be applied to fractured limb in 30 sec. by untrained attendant. Immediate first aid thus possible should reduce transportation injuries to patient on way to hospital. X-rays can be taken without removing splint. *Orthopedic Frame Co.*

146—Emergency Water Fountain sprays cleansing water from all angles to blanket facial area. Provides immediate first aid in accidental contamination by chemicals, caustics, fire, etc. Once activated, spray continues until manually closed. *Haws Drinking Faucet Co.*

Turn the page

WATCH THIS



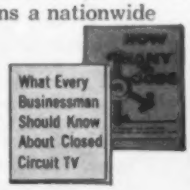
Keeping an Eye on Gauge and Rollers at a Reversing Mill

On GPL Closed Circuit TV

- **Training • Production Control • Surveillance**
- **Property Protection • Material Handling**
- **Dangerous Viewing • Traffic Control • Work Coordination**
- **Process Control • Centralized Record Viewing**

GPL, first in closed circuit TV sales, can provide a reliable, high-quality system for you at surprisingly low cost. GPL maintains a nationwide sales and service network for your convenience.

To learn why more and more of the nation's industrial leaders are turning to GPL Closed Circuit TV, write for FREE brochures, "How Many Jobs" and "What Every Businessman Should Know About Closed Circuit TV."



GPL DIVISION
GENERAL PRECISION, INC.

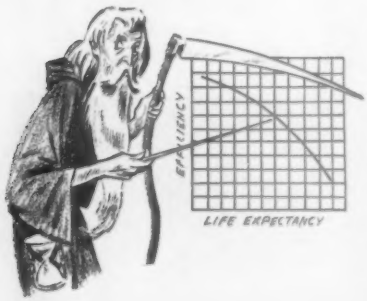
Pleasantville, New York

Facts of Light!

CHAMPION Lamps

YOU SPEND NEARLY $2.50 TO OPERATE A 25 CENT LAMP

The electric power required to operate a 25 cent incandescent lamp will amount to nearly $2.50 before the lamp burns out. The efficiency with which a lamp converts electric power into usable light, then, is an important factor in considering lamp value.



YOU CAN'T GET BOTH HIGH EFFICIENCY AND LONG LIFE IN INCANDESCENT LAMPS

General service incandescent lamps are designed so that the ratio between life and efficiency results in lowest overall lighting cost for the average installation. When efficiency is increased, lamp life is shortened. When lamp life is extended, efficiency goes down. Occasionally it makes sense to sacrifice efficiency for long life; for instance, when installing "long life" reflector lamps in inaccessible locations to minimize the high maintenance costs.

SPLITTING HAIRS IS IMPORTANT IN MAKING LAMPS

The filament wire in some incandescent lamps is only 1/5 the diameter of a human hair. A variation of only 1% in this tiny diameter can affect lamp life by 25%. Needless to say, it takes precision equipment and careful workmanship to insure that millions of bulbs a year pass Champion's rigid quality inspections.

THESE LAMPS EXPECT ROUGH TREATMENT

In order to withstand abuse such as shock encountered in extension cord service, Rough Service lamps employ as many as 14 supports on the filament. Vibration Service Lamps also have special supports to withstand high frequency vibration such as produced by high speed machinery.

CHAMPION LAMP WORKS, Lynn, Massachusetts

CHAMPION INCANDESCENT-FLUORESCENT • *YOUR BEST BUY IN LAMPS*

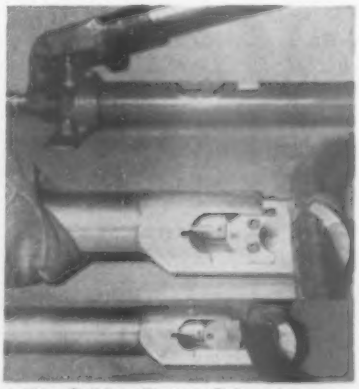
FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.

147—Lift Truck has full set of controls on rider platform for steering, lifting, lowering, and driving in narrow aisles. In 1500- to 3000-lb. capacities, 81- to 105-in. lengths, 101- to 129-in. lifts. Simplifies order picking from tiered shelves. *Lewis-Shepard Products, Inc.*

148—D-C Crane Control and rectifier combination cuts maintenance to minimum. Uses static rectifiers for series-wound d-c crane motor and brake. Affords better stability for safe lowering of heavy loads. No load-retarding or indicating devices are needed. *Square D Co.*



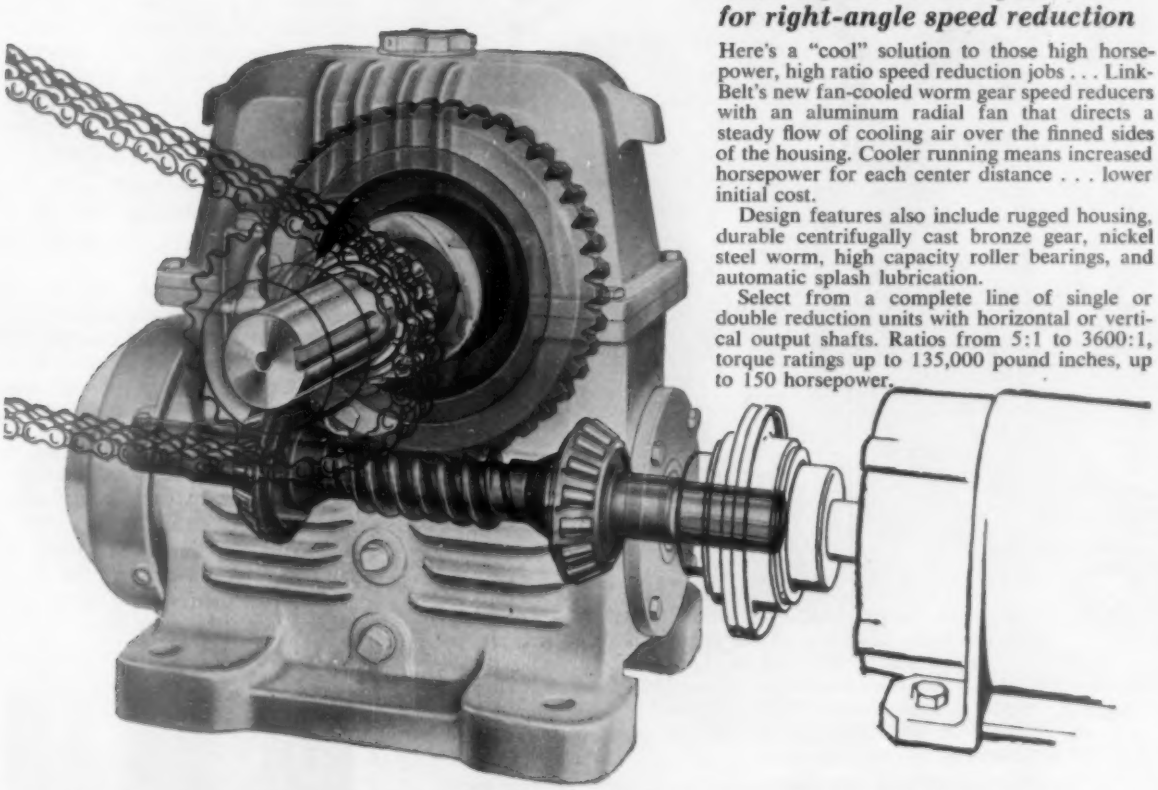
149—Cable Cutter-Crimper pares minutes off time needed to cut and splice large electric cables in confined area. Tool (top photo) with blade attachment is cutting around cable. Crimping attachment (bottom) and connector sleeve is making coupling. *Welsbach Equipment Co.*

Turn the page

NEW LINK-BELT WORM GEAR SPEED REDUCERS

fan-cooled high capacity compact

Industry's most complete line for right-angle speed reduction



Here's a "cool" solution to those high horsepower, high ratio speed reduction jobs . . . Link-Belt's new fan-cooled worm gear speed reducers with an aluminum radial fan that directs a steady flow of cooling air over the finned sides of the housing. Cooler running means increased horsepower for each center distance . . . lower initial cost.

Design features also include rugged housing, durable centrifugally cast bronze gear, nickel steel worm, high capacity roller bearings, and automatic splash lubrication.

Select from a complete line of single or double reduction units with horizontal or vertical output shafts. Ratios from 5:1 to 3600:1, torque ratings up to 135,000 pound inches, up to 150 horsepower.

FOR FULL-LINE FACTS

on Link-Belt's comprehensive line of speed reducers—contact your nearest Link-Belt office or authorized stock-carrying distributor . . . or check and send this coupon to Link-Belt Company for data on all or any combination of the following:

- ☐ gearmotors—Catalog 2747
- ☐ motogears—Catalog 2747
- ☐ in-line helical gear speed reducers—Catalog 2751
- ☐ shaft-mounted speed reducers—Catalog 2618
- ☒ worm gear speed reducers—Catalog 2824
- ☐ universal worm gear speed reducers—Catalog 2724
- ☐ parallel shaft speed reducers—Catalog 2719
- ☐ fluid drives—Catalog 2747
- ☐ P.I.V. variable speed drives—Catalog 2274

LINK-BELT

15,340

PRUDENTIAL PLAZA, CHICAGO 1, ILL.

NAME_____

FIRM_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

New Kidde carbon dioxide portables awarded highest U.L. rating!

Belleville, N. J. – A spokesman for Walter Kidde & Company announced here today that four of the company's new portable fire extinguishers have been awarded the Underwriters' Laboratories highest ratings for their respective capacities. To those interested in fire safety, this means that, pound for pound, these new Kidde units have more fire-killing power than any other carbon dioxide extinguishers on the market today.

Available in 15 and 20 pound capacities, in either squeeze valve or trigger models, these power-packed Kidde units feature new hose and discharge horn assemblies, which are responsible for their extra fire fighting ability. The new assembly is supplied also with Kidde's 10 pound carbon dioxide portable which has a U. L. rating not exceeded by any other extinguisher of its capacity. This hose-horn combination is also being offered as a replacement unit for existing 10, 15 and 20 pound carbon dioxide units, and when attached will upgrade their effectiveness equal to the new ratings.

For more information on these top-rated Kidde carbon dioxide portables write Kidde today.

Kidde

Industrial and Marine Division
Walter Kidde & Company, Inc.
632 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto — Vancouver

FACTORY/EQUIPMENT NEWS

Begins on page 122

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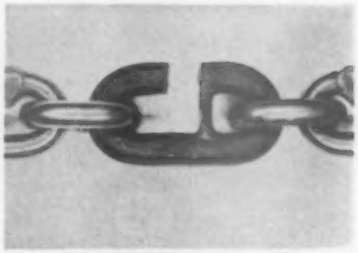


150—"C" Links, attached to 2-ft. sections of alloy chain, provide detachable chain-to-chain connection for making endless slings. For use where unwieldly loads make positioning of normal endless slings awkward. In ¼- and ½-in. diameters. *American Chain & Cable Co.*

151—Governor-Wattmeter permits paralleling of two or more dissimilar diesel generators. Load is automatically distributed. Speed recovery within 1 sec. Output, to 10 watts, powers electro-mechanical fuel valves. In 50-, 60-, 400-cycle ratings. *Consolidated Controls Corp.*

152—Gripper Arms, for bolting to arm carriers of any hydraulic lift truck clamp, pick up cartons, bales, crates, rolls, etc. without pallets. Shape-up bars prevent crushing of corner cartons. All four arms have adjustable toe-in. No load-sag. *Little Giant Products, Inc.*

153—Liquid Filter is answer to pilot plant or development applications needing only small flow. Choice of four filter elements to trap small particles including bacteria, algae. Built-in cleaner; four sizes, flow rates to 4 gpm. per sq. ft. Low cost. *R. P. Adams Co.*

Turn the page

For more facts Circle 473 on Reader Service Card
For more facts Circle 474 on Reader Service Card ➤

and they run
and they run
and they run

1903—
Indianapolis.
a trolley car.
a rolling adventure surrounded by noise.
pennies, nickels, children . . .

and inside—
a Fairbanks Morse electric motor.
it drove the trolley over thousands of miles
and rode with it
into glorious retirement.

pick a year—
from the turn of the century until now.
pick a month,
pick a day,
pick a city,
pick a town—
our motors are in its history . . .
pulsing, driving, working.
powering the things we need
and the things we want.
pushing our daily advances.
pulling us into the future.

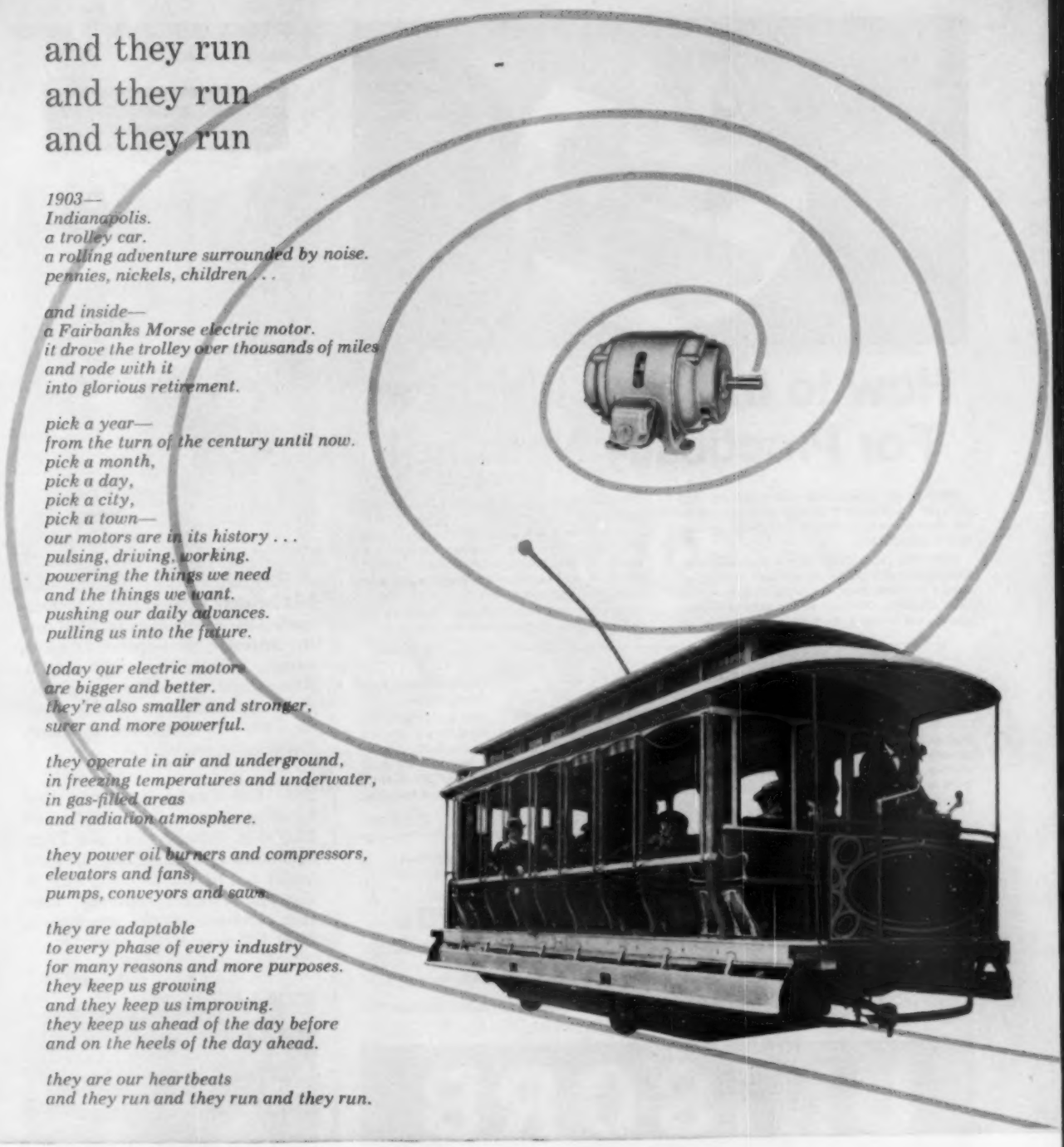
today our electric motors
are bigger and better.
they're also smaller and stronger,
surer and more powerful.

they operate in air and underground,
in freezing temperatures and underwater,
in gas-filled areas
and radiation atmosphere.

they power oil burners and compressors,
elevators and fans,
pumps, conveyors and saws.

they are adaptable
to every phase of every industry
for many reasons and more purposes.
they keep us growing
and they keep us improving.
they keep us ahead of the day before
and on the heels of the day ahead.

they are our heartbeats
and they run and they run and they run.

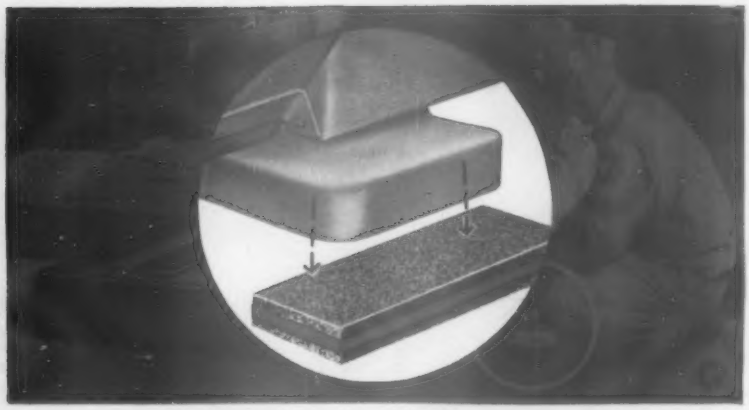


Fairbanks, Morse

A MAJOR INDUSTRIAL COMPONENT OF **FAIRBANKS WHITNEY CORPORATION**

The electric motor is one of the most versatile sources of power ever developed. It is economical, practical and time-resistant. Fairbanks-Morse electric motors can turn out ⅓ horsepower or 10,000 horsepower, meet every known job demand within this range or be custom-specified to your blue-print projections. Whatever your production needs or plans may be, our electric motors can power them.

If you are in a field where power for production must be efficient, effective and dependable—we suggest that you consider our great variety of electric motors. For further information please write to: Mr. George H. Herrick, Vice President and General Manager, Electrical Division, Fairbanks, Morse & Co., Freeport, Illinois.



How to Install A Machine For Practically Nothing!

Plant, after plant after plant tell us that Unisorb pads more than pay for themselves by saving time, materials and labor in machine installation.

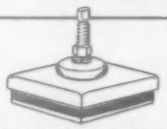
Now, whether a single unit or a whole plant, installation is a matter of minutes instead of hours. Unisorb pads are cut to size, buttered with Unisorb Cement and machine immediately set in place. No bolts or lag screws, no floor drilling, no tricky spotting. Actual savings go to 80%!

Unisorb is also a lifesaver on plant moves. A Unisorb Mounting Program, prepared in advance, speeds the entire move — production lines can be returned to operation overnight or over a week-end.

Here are the three methods that give you this money-saving machine mounting . . .

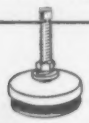
Unisorb Mounting Pads

Specially engineered in a selection of densities and thickness to provide optimum vibration control for all types of machines. Absorbs 85% of transmitted vibration, cuts noise, improves machine performance, reduces maintenance.



Unisorb Level-Rite/ Heavy Duty

The Level-Rite line has been developed for fast, precise leveling and effective vibration control. Machine legs rest on exclusive, free floating screw-post and leveling plate. No bolts, lag screws or cement required, machine is always mobile.



Unisorb Level-Rite "200"

The "Junior" model is a practical, low-cost mount for controlling vibration and maintaining level of small and medium sized machines. Ideal for light machine tools, office, air conditioning and laboratory equipment, layout benches, and shop tools. Loadings up to 200 lbs. per unit.

Remember — to simplify installation, improve performance, and control vibration . . .

UNISORB MOUNTS MAKE THE DIFFERENCE

A complete selection of densities and thicknesses for the smallest laboratory device to giant presses.
Ask for a **Money-Back Trial . . . NOW!**

UNISORB

UNISORB 206 SOUTH STREET, BOSTON 11, MASSACHUSETTS

Division of The FELTERS Company New York, N. Y. • Chicago, Ill. • Detroit, Mich. • Upper Darby, Penna. • St. Louis, Mo. • Taylor Felt & Supply Co., San Francisco, Calif. • Acorn Mfg. Co., Los Angeles, Calif.

Please send me a Unisorb Sample and Free Book.

Name.....

Company.....

Address.....

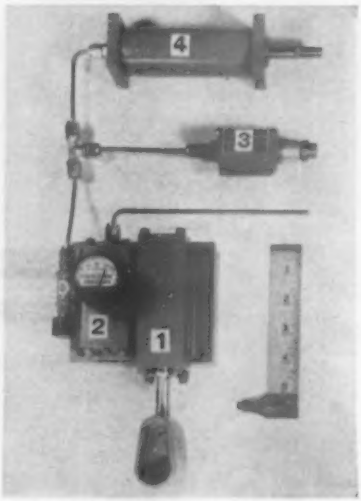
City.....Zone....State.....

FED-68

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.



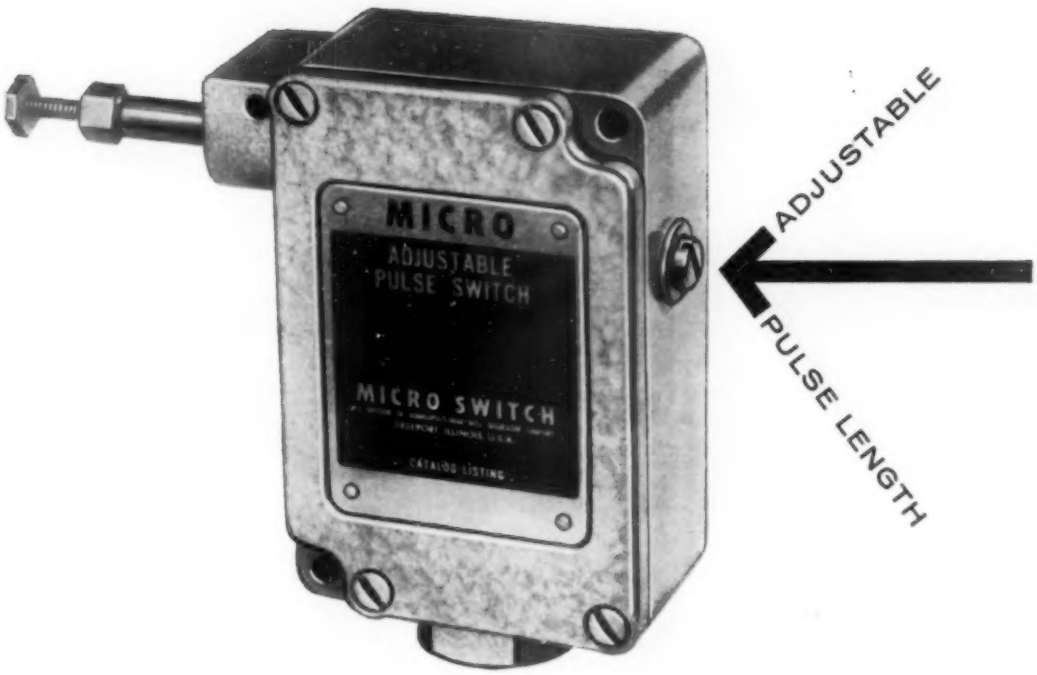
154—Safety Control senses temperature and/or pressures to 2000 psi., to activate pilot-operated valve, switch, warning, or other control. Non-electric, it is self-powered with small captive charge of compressed air. For all unattended machines. *California Controls Co.*

155—Lift Trucks, for heavy load handling, come in two models with 22,000-lb. capacity, 24- and 27-in. load centers. Turning radii for short model is 110 in.; for long, 122 in. Gasoline-powered; cushion tires. Has precision inching mechanism. *Yale & Towne Mfg. Co.*

156—Closed-Circuit TV Camera has rugged housing that protects it from outside electrical interference, vibration, and noise. Transistorized, it weighs only 9 lb. Operates on low 18-watt power input. Uses any 16mm lens, requires minimum light. *General Electric Co.*

Turn to page 164

MICRO SWITCH Precision Switches



NEW Single-Pulse Switch

with adjustable pulse length

EASY TO WIRE. By removing the cover plate, the #8 binder head terminal screws are easily accessible for wiring. The "1PD1" has single-pole double-throw contact arrangement, 10 amps.—125, 250 or 480 vac.

A new limit switch has been introduced by MICRO SWITCH for applications where momentary opening and/or closing of a circuit is necessary. It is designed for control of intermittent-duty devices.

The entire pulse operation—actuation and release—is accomplished by depressing the operating plunger. An exclusive feature of the MICRO SWITCH "1PD1" allows adjustment of the pulse from .030" to .450" by simply turning a screw on the outside of the housing. The "1PD1" is sealed against oil, water and dust. Call your MICRO SWITCH Authorized Distributor or the branch office listed in the Yellow Pages. Ask for Data Sheet 173.

MICRO SWITCH . . . FREEPORT, ILLINOIS
A division of Honeywell
In Canada: Honeywell Controls Limited, Toronto 17, Ontario

75 YEARS HONEYWELL PIONEERING THE FUTURE

Honeywell
MICRO SWITCH Precision Switches

Speedy, safe Yale electrics

make loading, dock handling and warehousing quicker, easier, less expensive for you. Special features of these end-control electrics include high lifting speed, a turning radius so short that the truck can turn within an inch of its own length and a low step for easy on-and-off operation. A choice of controls is available, specially designed to suit a wide variety of operations. Choose the one that suits your applications best—they all protect fragile loads. Interlocking I-beam mast construction prevents edge-to-edge wear and strain. Economy of operation is assured because of efficiency of handling and long life of the equipment. Capacities: 2000 and 3000 lbs. Yale's new end-control electric is just one truck in the most complete line of industrial lift trucks and hoists manufactured today. For more information contact your Yale representative or write to The Yale & Towne Manufacturing Company, Materials Handling Division, Philadelphia 15, Pa., Dept. KT8.

Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. Manufacturing Plants: Philadelphia, Pa., Forrest City, Ark. Products: Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks · Worksavers · Warehousers · Hand Trucks · Industrial Tractor Shovels Hand, Air and Electric Hoists.

YALE®

INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS · HOISTS

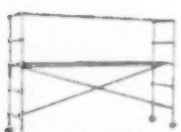
YALE & TOWNE

OIL
SALADS
COOKING
FRYING
BAKING
BALBO
V-8 VEGETABLE JUICES
YALE

$10,000 LABOR SAVED ON IN-PLANT REMODELING

Up-Right aluminum scaffold-on-wheels gets men up in the air fast...lets them finish the job fast! Lightweight and quickly assembled without tools or loose parts, Up-Right scaffolds are adjustable to provide a safe, convenient working platform at any desired height. In 3 basic types for overhead installation and maintenance.

STAIRWAY TYPE



SPAN TYPE

TALLESCOPE

HERE'S HOW INDUSTRY SAVES ON OVERHEAD MAINTENANCE WITH NEW ALUMINUM SCAFFOLD

Working from 2 sets of stairway-type scaffolds, regular maintenance personnel recently completed a 2½ year program of overhead remodeling at Waco, Texas, plant. Interiors and exteriors of 4-story buildings were painted, 400,000 square feet of metal ceilings were replaced with acoustical tile and complete new electrical, heating and plumbing systems were installed. Up-right portable aluminum scaffolds provided savings in labor cost estimated at $10,000 and contributed to a perfect safety record for the 2½ year period. Scaffolds were rapidly assembled to reach desired height and rolled with the job.

Write for descriptive circulars

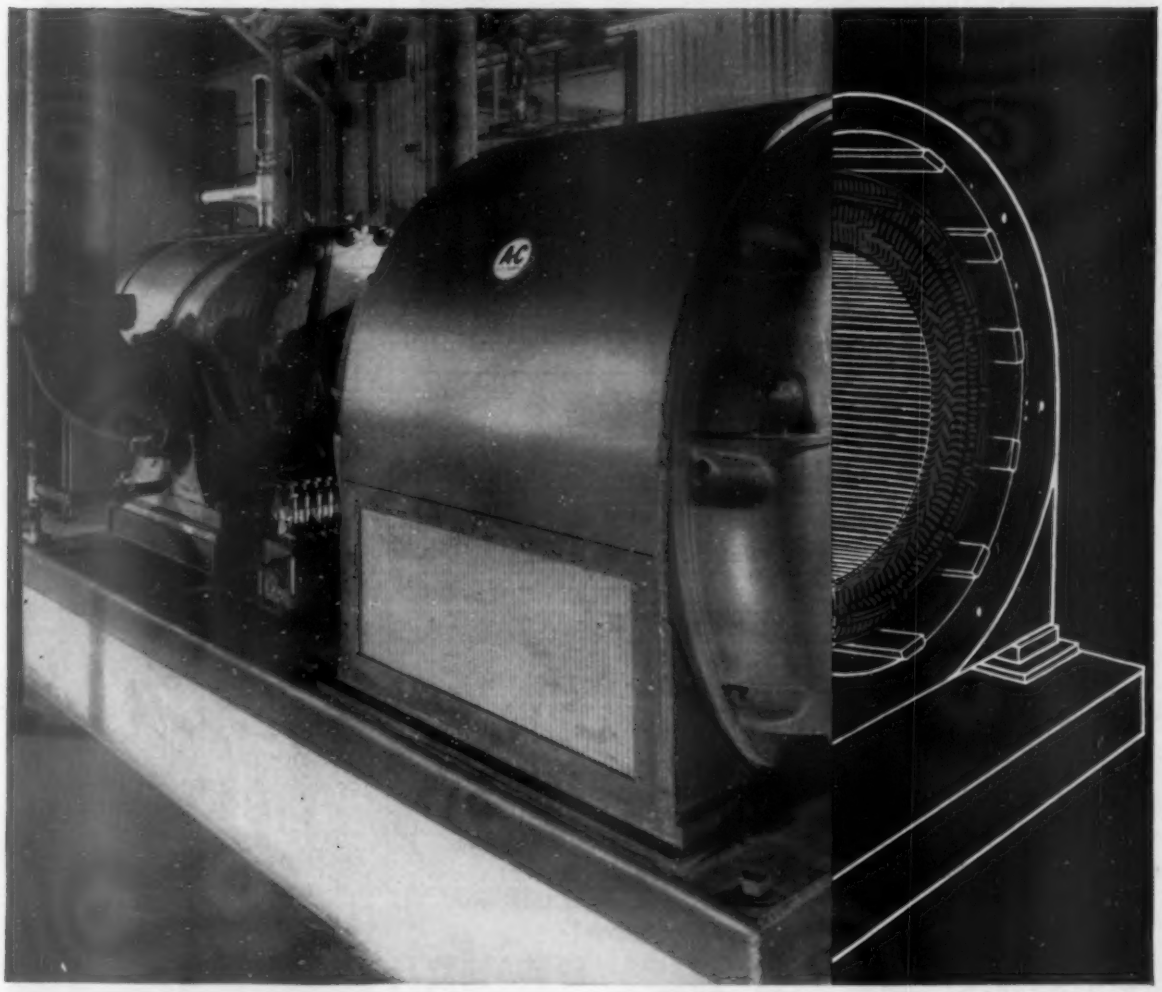
UP-RIGHT SCAFFOLDS

DEPT. 178, 1013 PARDEE, BERKELEY, CALIFORNIA

In Canada: Up-Right Scaffolds, Ltd., 120 Russet Ave., Oshawa, Ontario

For more facts circle 478 on Reader Service Card

ALLIS-CHALMERS



Silco-Flex insulation in this compressor application provides complete protection against practically every enemy of motor insulation.

Your major motor investments are protected by Allis-Chalmers

invisible standards of perfection

Allis-Chalmers motors prove the value of thinking beyond established design standards. This thinking, applied to research, development and manufacturing, has led to advanced design features which mean greater application versatility, exceptional reliability and extended motor life. These are invisible standards of perfection you get with Allis-Chalmers motors.

Silco-Flex insulation, for example, has completely changed the rules on open-motor application. It is impervious to moisture, oils, and most acids, alkalies and solvents. It is resistant to abrasion, and is capable of withstanding high temperatures. Its resilience provides durability to withstand shock and vibration.

Super-Seal motors, with *Silco-Flex* insulation, have proved themselves for more than five years under the most severe conditions in industry.

Advancements such as capsule bearings, split end housings, and *Integrated* field coils (for synchronous motors) add to the superior performance of *Super-Seal* motors.

They contribute to the invisible standards that protect your motor investments year after year — cut replacement costs — assure uninterrupted production.

To learn more, call your nearby A-C representative, or write ***Allis-Chalmers,*** *Power Equipment Division, Milwaukee 1, Wisconsin.* A-1297

Super-Seal and Silco-Flex are Allis-Chalmers trademarks.

Powell's FLOW-MATIC materials handling system in action at Steel City Electric Co., Pittsburgh, Pa.

Gained . . . 45% in floor space . . . 30% in handling time by POWELL'S *Flow-Matic**

Steel City Electric Company has realized 45% more floor space for storage of process material and 30% in material handling on electrical parts production lines—with Powell's unique FLOW-MATIC* materials handling system. Other cost-minded companies have gained as much as 50% in handling time with FLOW-MATIC*. *You can too! Why not investigate?* *TM

Powell's unique FLOW-MATIC boxes stack easily and neatly in a minimum of floor space at Steel City Electric Co.

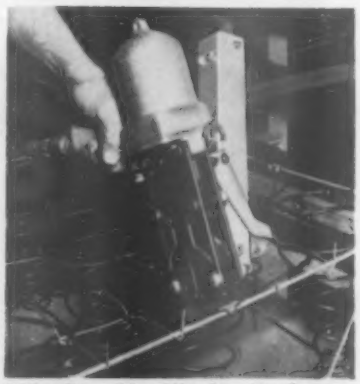
THE POWELL PRESSED STEEL COMPANY
50 ERIE STREET • HUBBARD, OHIO
The most complete line of material handling equipment.

For more facts Circle 480 on Reader Service Card

FACTORY/EQUIPMENT NEWS

Begins on page 122

For more about these items, circle item numbers on Reader Service Card next to back cover.



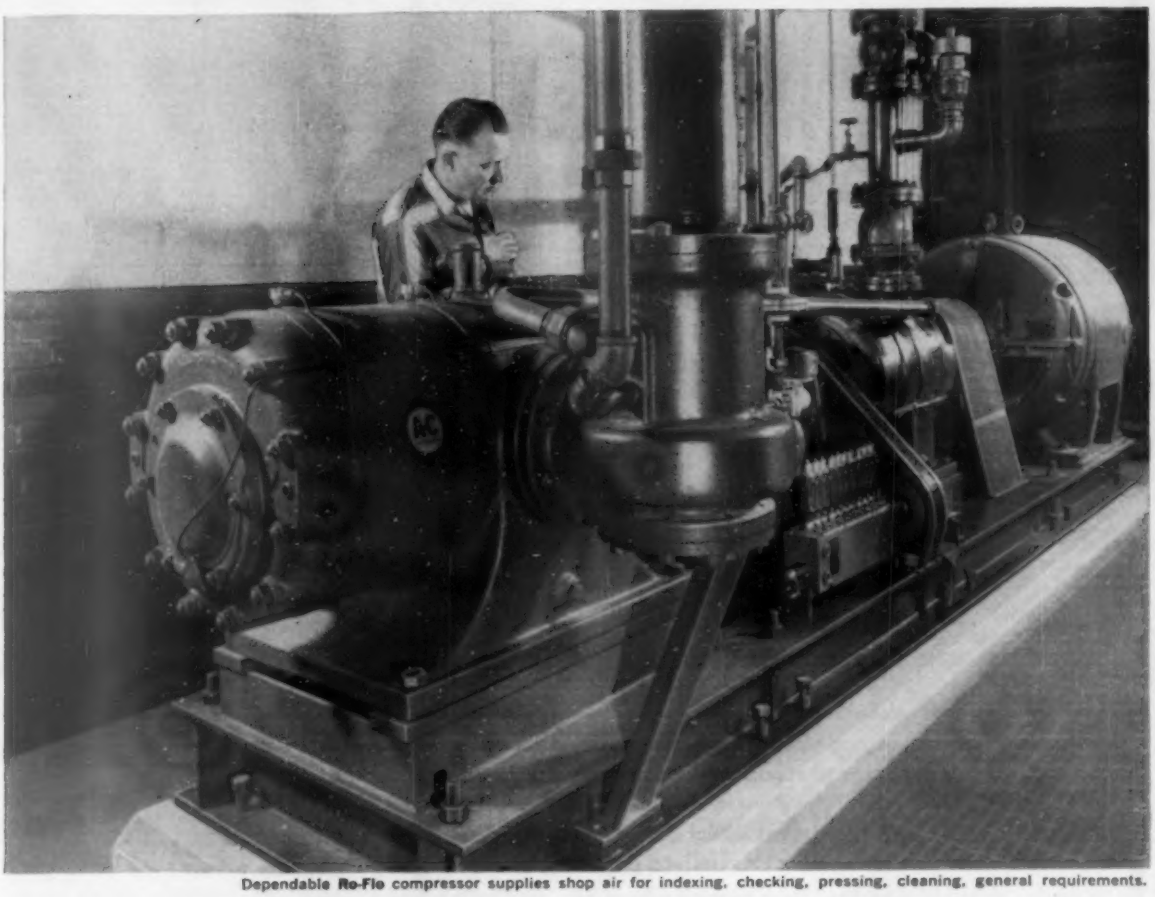
157—Portable Clipping Tool automatically wraps magazine-fed metal clip tightly around two wires. Outmodes manual clipping of wires with pliers. Weighs 5¾ lb. Two models, with magazine capacity of 50 and 75 clips, join 7 to 13 gage wires. Air-powered. *Paslode Co.*

158—Ventilator-Skylight combination uses glass-fiber components to give diffused natural light whether ventilator damper is open or closed. Economical unit requires only one roof opening, one installation. Nonwarping, resists weather, chemicals. *Swartwout Fabricators, Inc.*

159—Storage Rack holds extra-long parts such as tubes, rods. Gets unwieldy items off plant floor and keeps them in order, easily accessible. Comes in angle-type shelving that's bolted together, or T-line for assembly with quick-fastening clip. *Alan Wood Steel Co.*

Turn the page

ALLIS-CHALMERS



Dependable **Ro-Flo** compressor supplies shop air for indexing, checking, pressing, cleaning, general requirements.

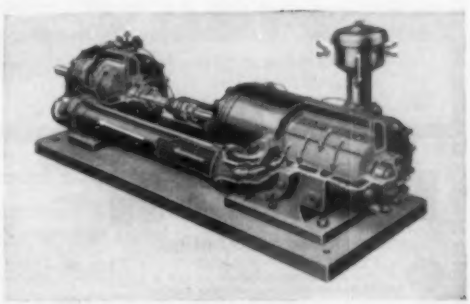
Record-breaking run in Allegan

no new parts for this RO-FLO compressor since installation

With 17 years of trouble-free experience using A-C rotary compressors, Rockwell-Standard Corporation installed this two-stage *Ro-Flo* sliding-vane compressor at their Universal Joint Division, Allegan, Michigan, in January, 1957.

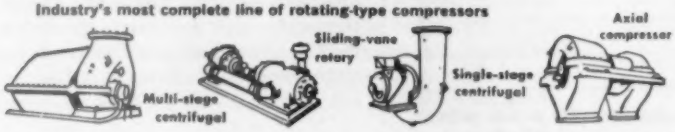
It hasn't let them down. It's been operating 24 hours a day, six to seven days a week, with no major stoppages and no new parts installed since the initial start-up three years ago.

Ask your A-C representative about low-noise, low-maintenance *Ro-Flo* compressors. Or write **Allis-Chalmers,** Industrial Equipment Division, Milwaukee 1, Wisconsin.



Sliding-vane action compensates for blade wear, helps maintain constant efficiency. Rotary motion cuts vibration and noise, eliminates shock and the necessity for expensive foundations. *Ro-Flo* is an Allis-Chalmers trademark. A-1306

Industry's most complete line of rotating-type compressors



PAYLOADER®

THE OVERWHELMING CHOICE

10,000 "HA" UNITS

More than 10,000 of this "PAYLOADER" model have been sold for industrial use—more than any other rubber-tired tractor-shovel.

The Model HA continues to be one of the most popular tractor-shovels in the complete "PAYLOADER" line. Its reputation for digging power — to scoop up and carry 2,000 lb. loads — ability to maneuver in close quarters with its short turning radius . . . its day-after-day dependability and low cost of operation are some of the reasons for its sustained popularity.

FOR MAXIMUM CONTINUOUS PRODUCTION in close quarters, the new Model H-25 "PAYLOADER" is recommended. It has an even shorter turning radius (6 ft.) than the Model HA and more operating capacity (2,500 lbs.), more power, plus full power-shift transmission and power-steer for faster cycling and easy, effortless operation. It is the production champion in its class.

FOR ANY JOB of bulk materials handling, indoors or outdoors, there's a "PAYLOADER" size available — up to 12,000 lb. operating capacity. A nearby Hough Distributor, with complete service-parts facilities, is ready to discuss your needs.

HOUGH®

THE FRANK G. HOUGH CO.
755 SUNNYSIDE AVENUE
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

Send me "Industrial Materials Handling the PAYLOADER Way"

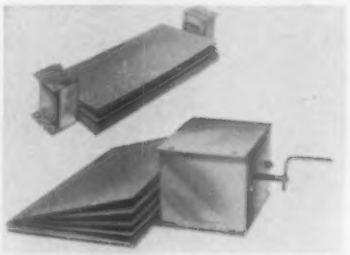
Name _____
Title _____
Company _____
Street _____
City _____
State _____

6-A-2

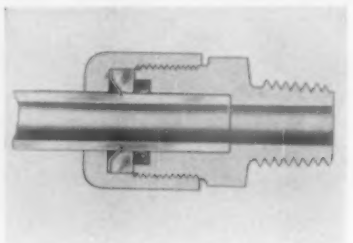
FACTORY/EQUIPMENT NEWS

Begins on page 122

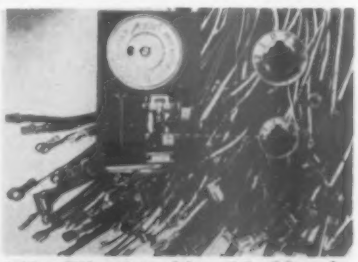
For more about these items, circle item numbers on Reader Service Card next to back cover.



160—Magnetic Sheet Separator floats round, square, or irregularly shaped steel sheets for feeding into presses, shears, etc. Minimizes equipment damage due to multiple sheet feeding; lowers production time. Adjusts to handle thicknesses from 32 to 7 gage. *Multifinish Mfg. Co.*

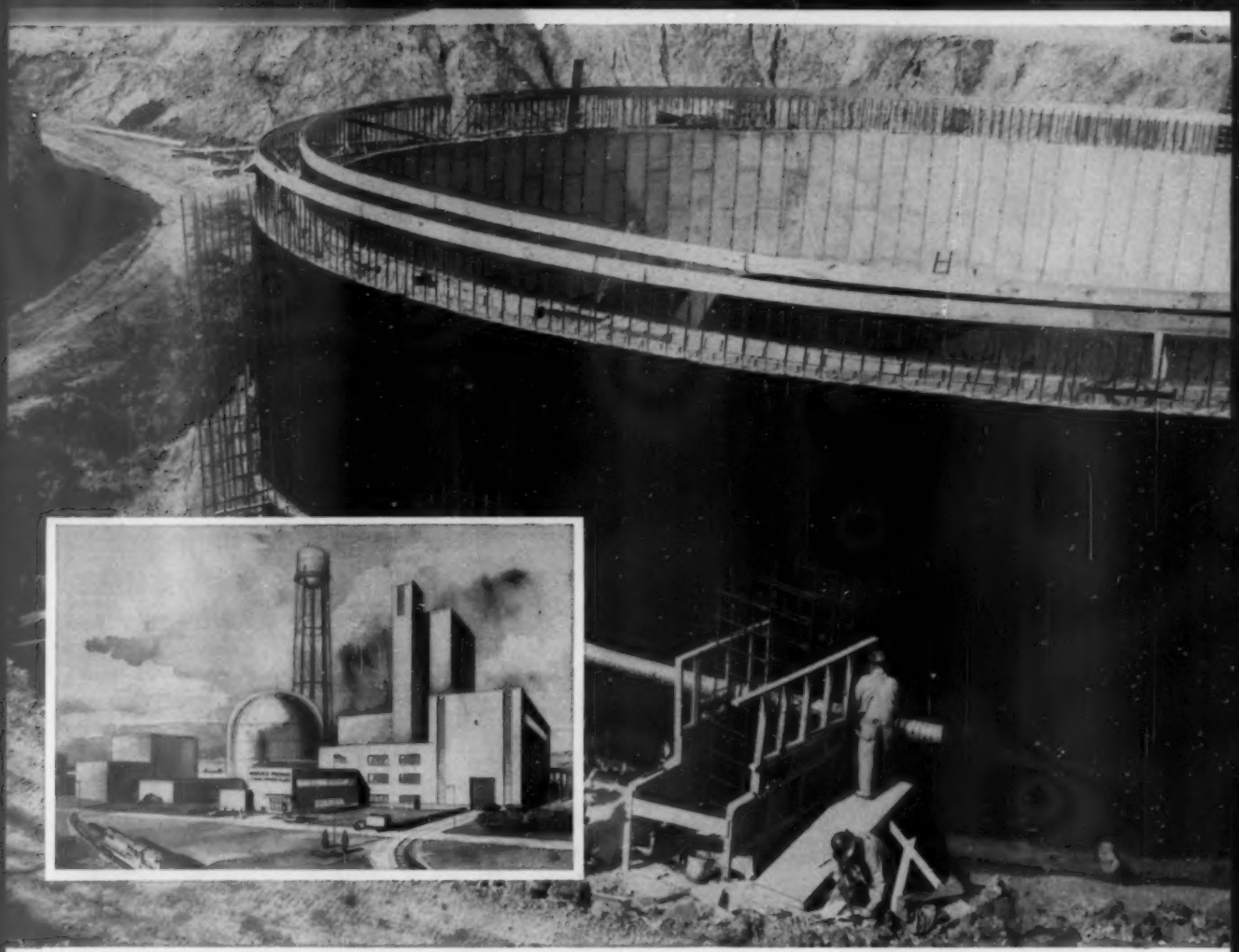


161—"Fast-Tite" Fitting makes positive leakproof connection in seconds with copper, plastic, or aluminum tubing from ¼ to 2 in. Tube is inserted into fitting, sealed tightly with twisting motion. For vacuum, gases, in many pressures and temperatures. *D & G Plastics Co.*



162—Wire-Attaching Machine installs ring, spade, fork, hook, snap-on or snap-in terminals, with or without insulation grip, by turning two selector dials. Handles many terminal styles, wire sizes from 22 to 10. You just turn the dial to change wire size. *Kent Mfg. Co.*

Turn the page



Bitumastic No. 50 waterproofs and protects concrete foundations at atomic power plant

When actual construction was begun in 1956 on the nation's largest "breeder type" atomic reactor and generating station—the 100,000-kw Enrico Fermi Atomic Power Plant—Bitumastic® No. 50 was called for in the plans for most below-grade concrete surfaces.

Nearly 40% of the 915-acre atomic power plant site at Monroe, Michigan, was originally marsh land or entirely submerged before a gigantic filling operation was undertaken. This subsurface condition made damp-proofing of reinforced concrete foundations—particularly of the reactor building, shown under construction, above—an important design consideration. Bitumastic No. 50, well-known for its resistance to water penetration, was applied in two coatings to all concrete foundations.

Bitumastic coatings have been performance-proven on many industrial installations where protection against water absorption, salts and industrial contamination which cause corrosion are essential. There is a Bitumastic coal-tar based coating for every industrial coating application. For more information on how the Bitumastic coating systems can benefit you, mail the coupon or write: Koppers Company, Inc., Tar Products Division, Pittsburgh 19, Pa. District Offices: Boston, Chicago, Los Angeles, Pittsburgh, New York and Woodward, Ala. In Canada: Koppers Products, Ltd., Toronto, Ontario.

For more facts Circle 483 on Reader Service Card

SEE OUR CATALOG IN SWEET'S

KOPPERS

KOPPERS

BITUMASTIC

COATINGS & ENAMELS

another fine product of COAL TAR

Koppers Company, Inc., Tar Products Division
Dept. 135F, Pittsburgh 19, Pa.

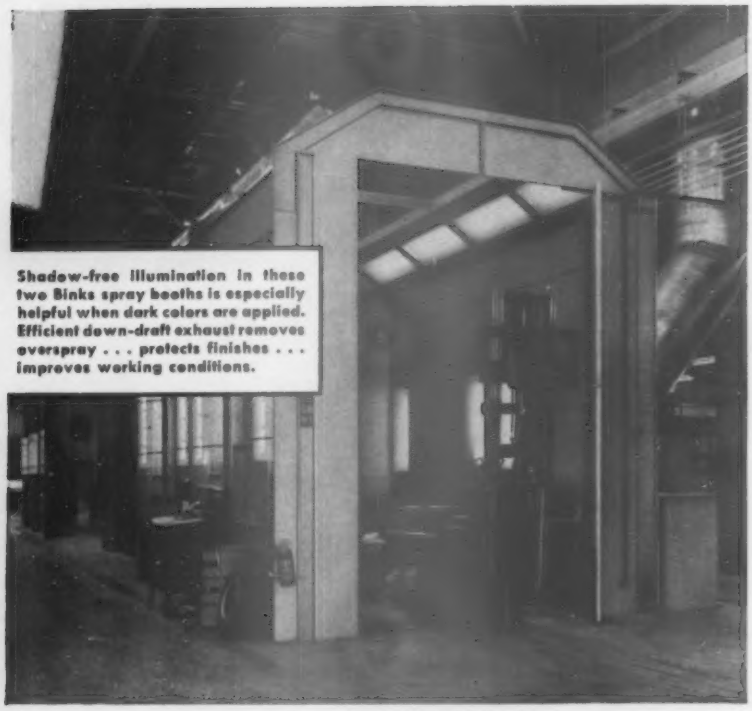
Gentlemen:
Yes, I'd like to know more about Bitumastic Coatings for Corrosion Prevention.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____



Shadow-free illumination in these two Binks spray booths is especially helpful when dark colors are applied. Efficient down-draft exhaust removes overspray . . . protects finishes . . . improves working conditions.

At Hyster Company, Danville, Illinois . . .

Integrated painting and production doubles lift truck output

"Painting is now an integrated part of our lift truck production line," reports Mr. A. L. Hazelbarth, Staff Assistant to the Factory Manager for the new Hyster Company plant in Danville, Illinois.

"The manufacturing knowledge of Binks spray finishing engineers helped us make the most efficient use of equipment, manpower and space."

Conveyorized painting
An under-the-floor conveyor guides trucks through each assembly phase. This same conveyor is used to guide the trucks through the painting phase. Intra-plant shuttling and holding area problems are eliminated. Maximum use is made of floor space.

Production-paced spray booths
Two 18′ high down-draft spray painting booths enable work to flow at a pace equal to assembly production. Shadowless illumination helps painters instantly spot imperfections. Work room is more than ample for efficient production.

Complete equipment coordination
A paint circulating system, hot spray and oven were all integrated by Binks engineers to give Hyster a production-tailored finishing operation of highest efficiency.

Call, wire or write today
See how Binks spray finishing engineers can help your product quality improvement and total cost reduction programs.

Ask about our spray painting school
Open to all . . . NO TUITION . . . covers all phases

0130

Binks
EVERYTHING FOR SPRAY PAINTING

SPRAY GUNS

MATERIAL HANDLING PUMPS

NATIONWIDE SERVICE

Binks Manufacturing Company
3114-34 West Carroll Avenue, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

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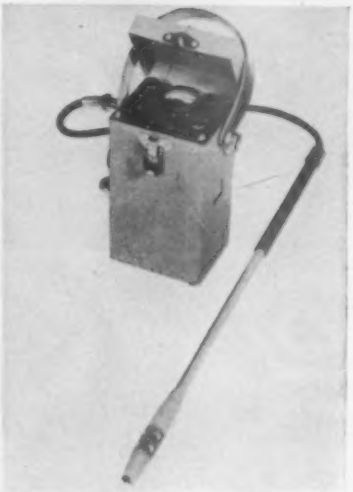
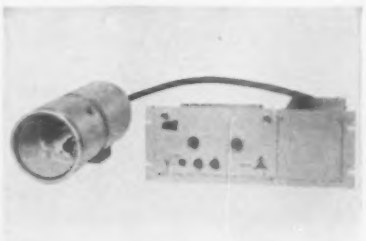
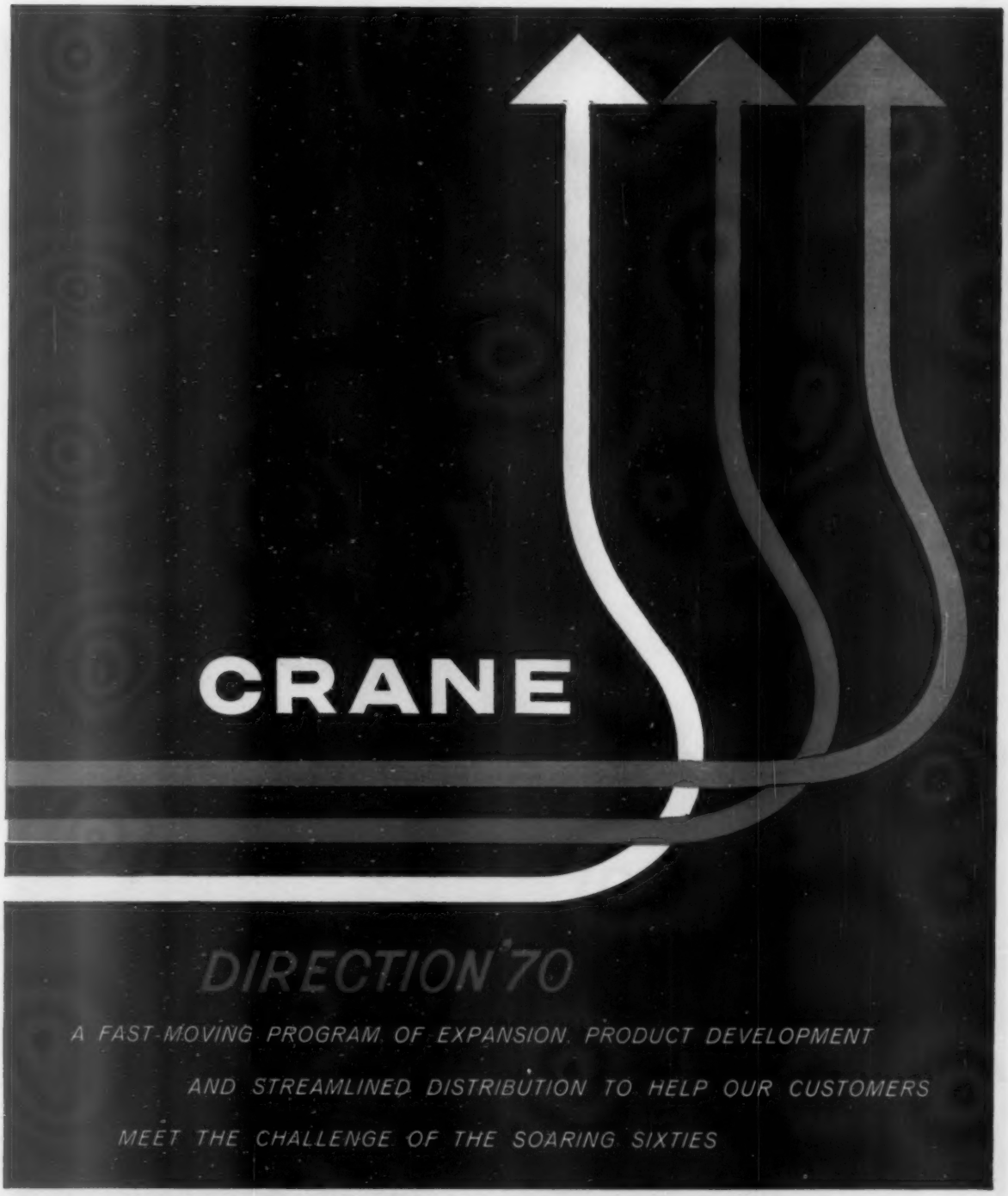


163—Portable Gas Detector has probe tip that needs only to be inserted around suspected area to accurately detect gas. Needs no elaborate procedures or sampling systems. Meter can be calibrated for lower explosive limit of any gas desired. *Houston Instrument Corp.*

164—Paper Towel Dispenser cuts off towel automatically when user pulls paper down. Eliminates buttons, cranks, and towel tear-off. Cold rolled steel cabinet, in baked white enamel, holds roll of 500 towels. Cover opens easily for servicing, locks securely. *Steiner Co.*



165—TV Camera and Control is housed in rugged case that withstands weather, shock, vibration, noise, salt spray, dust, etc. Transistorized, weighs 15 lb. Accepts any type or combination of lenses, including zoom. *Thompson Ramo Wooldridge Inc.*

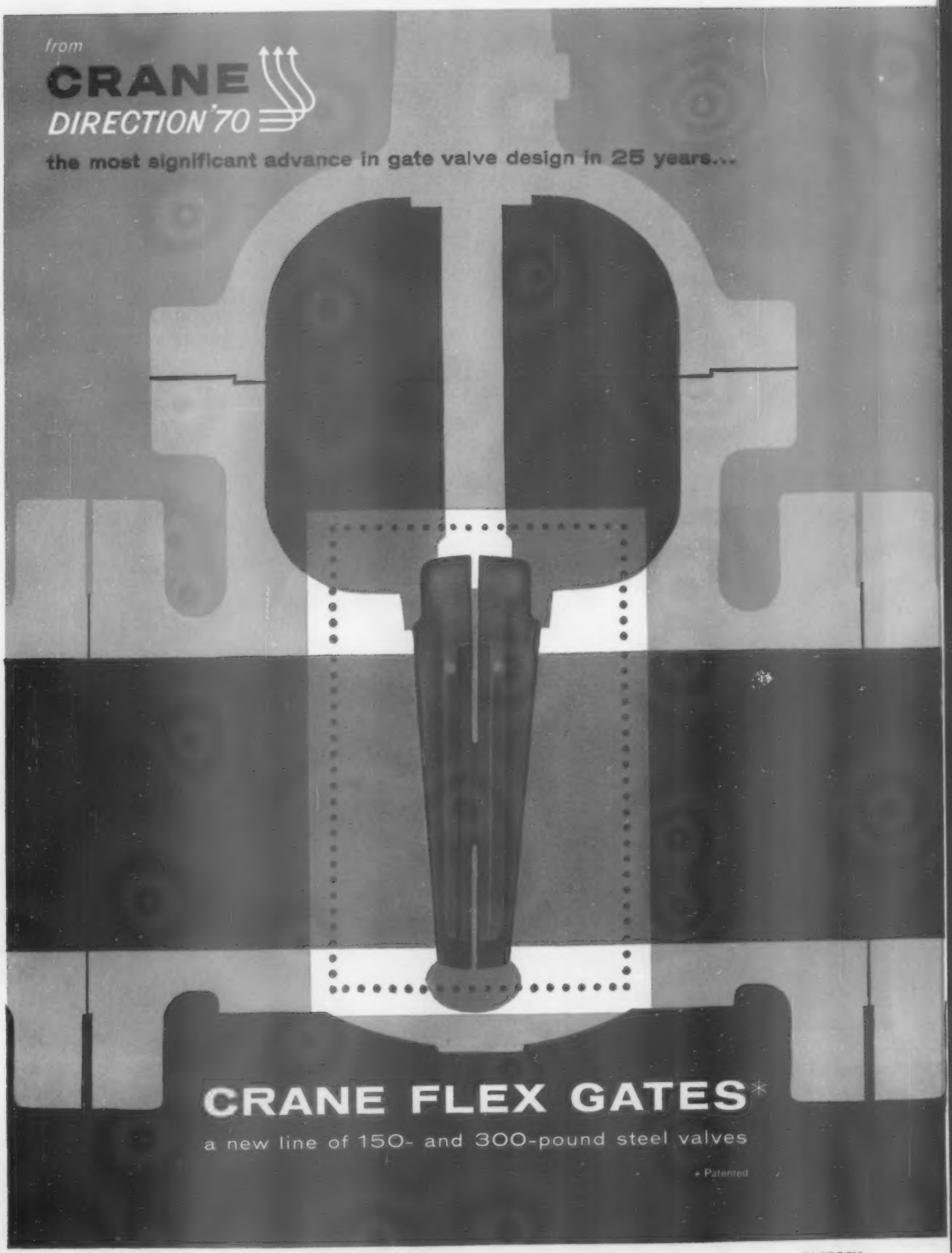

CRANE
DIRECTION '70
A FAST-MOVING PROGRAM OF EXPANSION, PRODUCT DEVELOPMENT
AND STREAMLINED DISTRIBUTION TO HELP OUR CUSTOMERS
MEET THE CHALLENGE OF THE SOARING SIXTIES

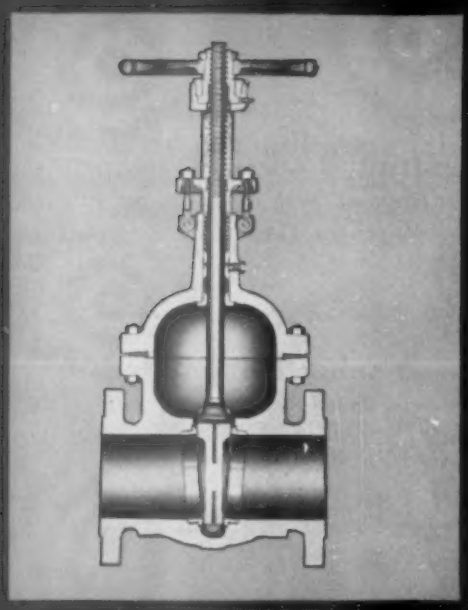
The Soaring Sixties have begun. This is the decade to be marked by accelerated industrial growth. By 1970, predictions are that . . .

- machinery production will double
- petroleum production will increase 4% to 5% each year
- chemicals are to double their present output at the current compound growth rate
- food processing will rise nearly 40%, paper and allied industries will expand about 60%

Total industrial production is estimated to rise some 60% in the next ten years. Looking at it another way, the prospective *increase* in manufacturing and mining is almost as large as the total output of just 12 years ago.

Crane announces Direction '70 . . . new products to help industry meet the challenge of the Soaring Sixties. These are products to improve quality control. These are products to increase production. These are products to help you control your costs. On the following pages is the first . . . the most significant Gate Valve improvement in 25 years. It's the first announcement of many you'll be seeing from Crane in Direction '70.


from
CRANE
DIRECTION '70
the most significant advance in gate valve design in 25 years...
CRANE FLEX GATES*
a new line of 150- and 300-pound steel valves
* Patented



Instead of being made with a solid disc, new Crane Flex Gates have separate disc faces, connected by the spool-like unit you see in the cross section. This joins the two seating faces, yet provides flexibility for the faces to seat tightly with independent action.

FLEXIBILITY PROVIDES THESE BENEFITS

BECAUSE THEY'RE FLEXIBLE, new Crane Flex Gates seat with less torque.

BECAUSE THEY'RE FLEXIBLE, new Crane Flex Gates unseat with less torque . . . will not stick closed even in high temperature service.

BECAUSE THEY'RE FLEXIBLE, minor deflection of seating faces due to pipe strains does not affect tightness of Crane Flex Gates.

BECAUSE THEY'RE FLEXIBLE, new Crane Flex Gates are tight on inlet seat and outlet seat over a wide range of pressures.

BECAUSE THEY'RE FLEXIBLE, new Crane Flex Gates can be used singly in some services where two conventional gate valves are frequently specified. You can save substantially on piping costs. And they have been exhaustively field tested.

BECAUSE THEY'RE FLEXIBLE, new Crane Flex Gates can be serviced—body seat rings replaced or seating faces refinished—quickly without painstaking accuracy. Slightly off-taper seats do not affect tightness or operating ease.

BECAUSE THEY'RE FLEXIBLE, new Crane Flex Gates will easily outperform any conventional solid wedge disc valve you now use. *And there's no increase in price.*

BECAUSE THEY'RE MADE BY CRANE, these new Flex Gates are completely dependable. You can use them with complete confidence on steam, water, gas, oil or oil vapor service. Stem and disc seating faces are Crane Exelloy. Shoulder-type body seat rings are Exelloy or Crane No. 49 Nickel Alloy. Sizes 12 inch and smaller; 150- and 300-pound pressure classes.

• • • • •

Ask your nearby Crane Distributor for full information on Flex Gates—and for data whenever you work with the products Crane makes. He has the newest in information *and* products. Crane Co., Industrial Products Group, 4100 South Kedzie Avenue, Chicago 32, Illinois.

CRANE®

VALVES • ELECTRONIC CONTROLS • PIPING
PLUMBING • HEATING • AIR CONDITIONING

FACTORY

IDEAS OF THE MONTH

By LEWIS K. URQUHART, Consulting Editor

(For more information, circle item numbers on Reader Service Card next to back cover)

Newest computer is the 400 *(Datamatic)*, aimed at customer who needs processing versatility of big machines, maybe not their volume capacity. Ideal set-up: 400 in branch plant with bigger 800 at GHQ. Or for the growing company: 400 now, 800 later on—with no need to reprogram files. **(236)**

Not satisfied with the coffee served in your cafeteria? Better read an 8-page report, "About Good Coffee," prepared by National Restaurant Association. It's just one valuable exhibit in an informative "treasure kit" *(Blickman)* of coffee and urn data. **(237)**

Booklet of the month is "Productive Purchasing" *(General Electric)* which tells how G-E is improving its own buying methods. The concept includes value analysis. Also compares services of competing suppliers. **(238)**

Acres of lawn to mow? New 3-reel Turf-King 76 *(Jacobsen)* is swell for large-capacity mowing. Powered by 9-hp., 4-cycle engine, it cuts 6-ft., 4-in. swath. Cutting speeds, from ¾ to 3½ mph.; transport speed, 6 mph. And get this: All three reels precede wheels, cut grass before it's flattened. **(239)**

If high-volume, high-speed testing is what you're after, take a long look at new digital read-out system *(Instron)*. With it you can run four tests per minute, with up to six printed values per test. **(240)**

Now Nu-Kote, the universal typewriter ribbon *(Burroughs)* that does all typewriter jobs, outwears three ordinary ribbons, fits nearly every standard without special spool. Sharp images after 2,340,000 impressions! **(241)**

Must reading for June: "Major Problems and Opportunities in Capital Goods Marketing During the Sixties" *(MAPI)*. Nominal charge. **(242)**

Miniature lamp users may find pocket-size booklet *(Chicago Miniature)* helpful. Its 24 pages list some 400 standard lamps, tell who makes which. Specifications, also complete nomenclature with drawings of various styles. **(243)**

Standards vs. Specials is title of 8-page, 2-color brochure *(Automatic Transportation)* designed to help you decide which type of industrial truck to buy. Points up five advantages of standard truck (in addition to usually lower cost) that you should check before voting for a special. **(244)**

For working in the rain, why not protective suits of lightweight yellow vinyl film *(Davis)*? Jacket, overalls, hood are full cut for free action. Electronically welded seams, plastic buttons, air vents under arms. Resistant to oils, chemicals, acids. Won't stiffen at 20 below. Easily washed. **(245)**

Erect-your-own work-holder kit *(Wilton Tool)* contains two 18-in. perforated strips of ¼-in. aluminum plate, three 90-deg. connecting angles, two toggle clamps, a dozen screws and nuts. Looks good for light assembly work. **(246)**

Jetfreight is newest way *(American Airlines)* to ship—in big 707's, of course. Did you know you can air-freight 100 lb. of wearing apparel, drugs, office machinery, etc., clear across the country for a $20 bill? Includes pick-up and delivery. Worth comparing with other methods? **(247)**

One way to save inspectors' time is to supply color-coded pressure-sensitive labels *(Avery)* that read "Accepted," "Rejected," "Re-work," "Calibrated," etc., in easy-to-read lettering. Space for inspector's name or number. **(248)**

Flamescents are new shatter-proof electric light bulbs *(Duro-Test)*. Dunk in ice water when they're hot, and you'll see. Fiberglas yarn is why, also produces beautiful gas-flame effect. New cooling crown means cooler-burning filaments, longer burning life. Lots of places where you'll want to try 'em. **(249)**

Why not tell your lab people about a new glass-blowing kit *(Bethlehem Apparatus)* that's just the thing for constructing, modifying, and repairing glass systems for chemical or vacuum use? **(250)**

High windows to wash? With new unit *(Tucker)*, man can stand on ground, reach up to 66 ft. Detergent tablets last half a day. **(251)**

Safe-Load Binder *(Danville Metal Stamping)* is what the doctors order for anyone who has to move cargo by truck. Minimizes readjustment time caused by load shifting during transit. Absolutely safe to operate. **(252)**

For high-precision work requiring absolute level, Serva-Levl Mounts *(Barry Controls)* compensate automatically for changes in loading, floor variations, thermal changes; isolate vibration and shock since machine is supported on cushion of air. And—no drilling, lagging, shimming. **(253)**

Lifting and moving heavy sheets—metal, plastic, fiber, glass, linoleum, etc.—is so easy and so safe with handy-dandy grippers *(Safety Vacuum)* made of aluminum with two 4-in. neoprene cups. **(254)**

Ballerina is the secretary-posture chair *(Columbia-Hallowell)* with the graceful legs (no curve at top, single curve at foot). Legs are machine-tapered so casters can be inserted without adapter. No caster fall-out. **(255)**

Turn the page

No more lawn-sprinkling headaches — if you have underground system with automatic controller *(Aqua-Dial)*, which times operation of up to 11 remote valves, each controlling portion of system. No need for watering crew. And do your sprinkling at night, if you like. **(256)**

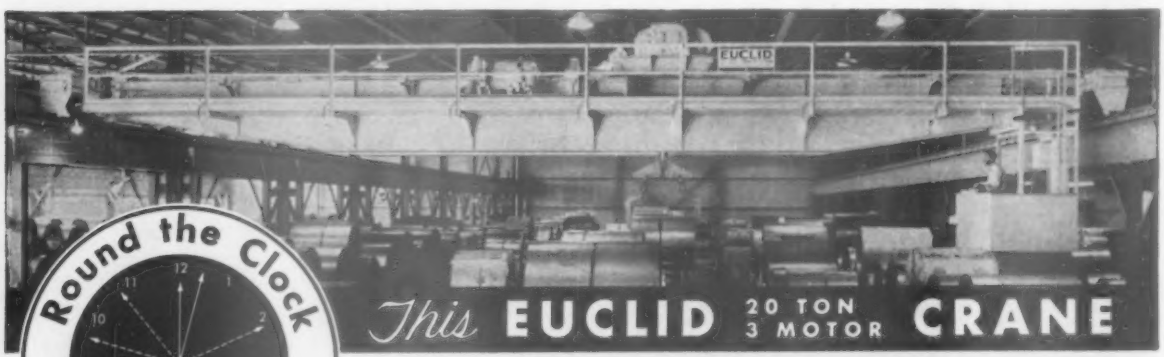
Handy-dandy Screw Check'r *(Ruelle)* tells size, thread count, tap and clearance drill sizes, length, tap series, basic diameter. Size, 3x5 in. Weighs just a few ounces. Threads won't strip under hand pressure. **(257)**

Plastic-zippered envelopes *(Kleer-Vu)* seal out dirt, keep job tickets, work sheets, etc., clean and readable. Size, 10½x13½ in. **(258)**

Precision roll ruler called Par-a-Glide *(Calmart)* measures distance horizontally and vertically, could be big timesaver for chartmakers, say, who have to draw circles, erect perpendicular lines, cross hatch, etc. **(259)**

Printed circuit draftsmen will find quick-reference chart *(By-Buk)* useful. It includes all pre-cut shapes and sizes of pressure-sensitive drafting aids needed to make paste-up drawings. Actual-size illustrations of shapes and available hole diameters of each. **(260)**

Turn the page



Expedites Steel Coil Handling IN and OUT of this STEEL WAREHOUSE and PROCESSING PLANT

Yes, practically anytime of the day or night you'll find a man at the controls of this double girder, cab-operated, overhead traveling crane. With an impressive span of 60′ it covers every square foot of one of the large storage bays at the Euclid, Ohio, plant of Chesterfield Steel Service Company. Ease of precision control and rapid acceleration and braking of all travel movements assure an unprecedented coil handling volume.

Built for Class 4 service, this crane is one of seven Euclid cranes in operation in this warehouse.

Euclid builds cranes in a wide range of spans and capacities for all purposes.

EUCLID
TRADE MARK REG. U.S. PAT. OFF.

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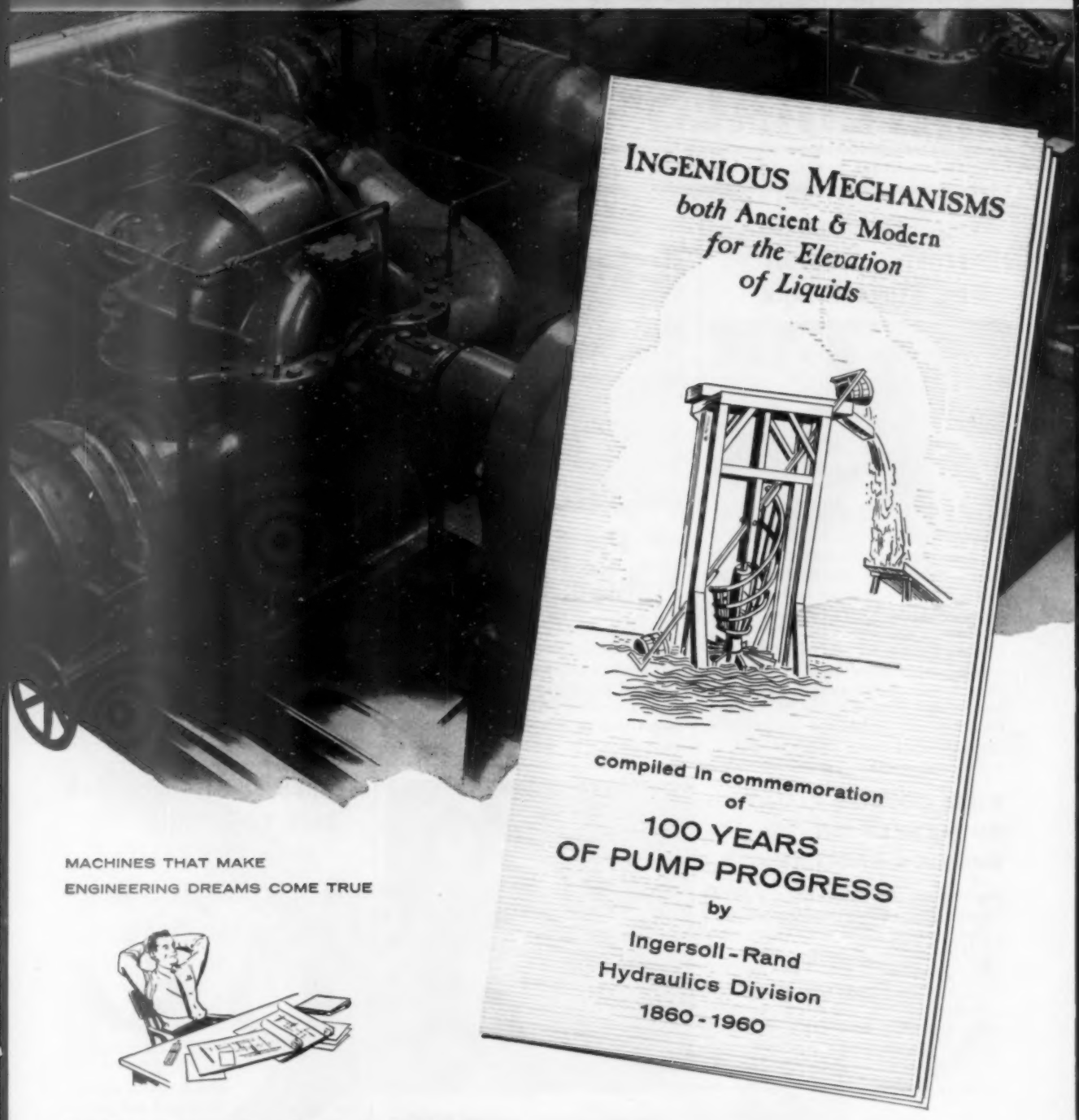

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ENGINEERING DREAMS COME TRUE

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A CENTURY 1860 — 1960 OF PUMP PROGRESS

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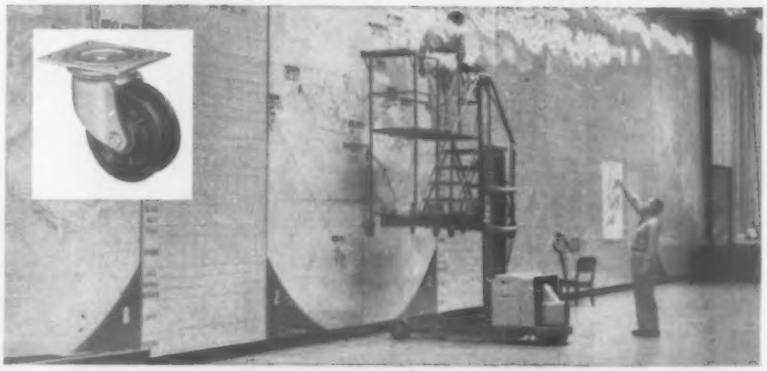
MATERIALS-HANDLING NEWS

NEW AND UNUSUAL APPLICATIONS OF BASSICK CASTERS THAT MIGHT BE ADAPTED TO YOUR HANDLING PROBLEMS

THIS CASTER GUIDES FLOATING ROOF OF OIL STORAGE TANK

Constant movement plus submersion in oil doesn't bother these Bassick casters and wheels. They're used on the roof of 67,000 barrel tank at the Tidewater Oil Tank Storage Farm in San Pedro, California. There's another Bassick wheel *inside* the tank mounted on pontoons that *float* to the top when the tank is full and help center the floating roof. This is typical of the way Bassick quality wheels and casters solve problems saving time, money and work.



The Strategic Air Command Where Fighting Facts Move on Bassick Casters!

At the Strategic Air Command's $10,000,000 Control Center, giant map panels (8 ft. x 20 ft.) roll quickly and smoothly on Bassick Grooved Wheel Casters. Weather information, operational facts, plans, all the vital information needed to direct global forces in peace or war goes *where* it's wanted . . . *when* it's wanted. Bassick grooved wheel casters and angle iron track offer a basic, unique, inexpensive and flexible means of moving engines, tools, parts and finished products at low cost. Simple means of movement through assembly lines or into and out of warehouse.

KING COTTON FLOATS TO MARKET ON BASSICK CASTERS

For 10 years, the Joanna Mills in South Carolina have moved giant 700 pound bales of cotton around like so many empty cardboard boxes. The real work is done by 33 dollies equipped with Bassick Floating Hub Casters. They have increased speed of movement by 35% and absorb the shock when bales slide down chute to waiting dollies. Saves time and makes work easier for employees.

STORES AND WAREHOUSES SAVE TIME AND MONEY WITH THIS CASTER

These Bassick D'mond Arrow Casters feature the highest ality steel and unique, two-level ball ra for easiest swiveling. Economical , they are ideal for light duty wh load capacities range from 100 to 250 lbs. They give quiet, easy action to light-duty trucks, service trucks, dollies and similar equipment. Attachments such as special stems, wide wheels and side brakes make this series particularly adaptable for many different uses. O.31

SEALED BEARINGS DEFY DIRT AND MOISTURE

Lubrication seals prevent dripping grease . . . avoids hazards

This is a beauty! Special lubrication seals on Bassick casters keep floors clean by eliminating the hazards of dripping grease. Seals are engineered to remain effective for the life of the caster. They can be easily flushed and new grease added without disassembly.

Ask Your Distributor!

Local industrial distributors carry popular Bassick models in stock. They will be glad to recommend the most efficient caster to solve your materials handling problems.

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For more facts Circle 488 on Reader Service Card

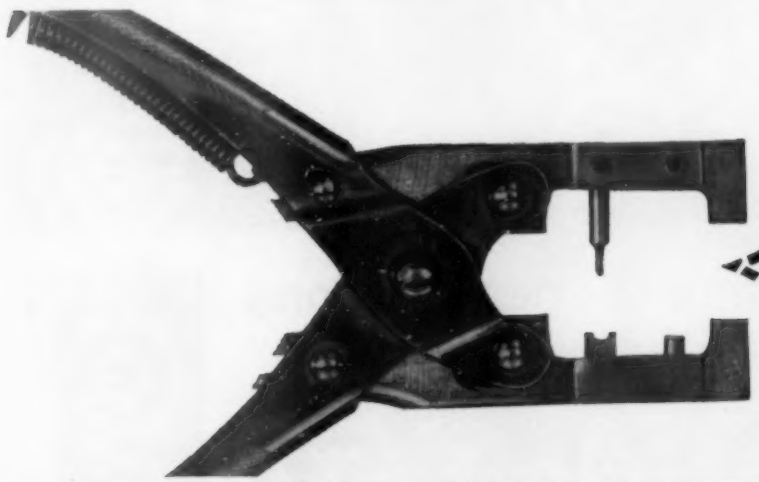
Coffee breakers will thank you kindly for providing new heat-barrier cups *(Dixie)* lined with polyethylene and banded on outside with foam plastic. Outside cup temperature is as much as 45 deg. lower than that of regular cup holding coffee—or tea—that's just as hot. **(261)**

Don't overlook Mark-On *(Tapemark)* when shopping for pressure-sensitive labeling tape. Uses "magic slate" principle. You can write on it for keeps with pen, pencil, stylus. Unaffected by temperatures from −40 F. to 160 F. **(262)**

Useful paperweight, calling-card size, is 6½-oz. die-cast decimal equivalent card *(Newton-New Haven).* Yellow figures on black. **(263)**

Temp-R-Tape *(Connecticut Hard Rubber)* is extreme-temperature (−100 F. to 400 F.) pressure-sensitive Teflon in 10 NEMA-approved colors. In 18-yd. rolls, in widths from ¼ to 2 in. Or by lineal yard, 12 in. wide. **(264)**

Now a linemarker *(Mine Safety Appliances)* that won't be knocked over, broken, or moved by passing vehicles. Flag assembly, 13½ in. high, is mounted on stable steel base; hollow spring holds flagstaff of ⅛-in. spring wire. She bounces back to upright position after every impact. **(265)**



Sargent has a plier-type tool that'll save you money (and if we don't, we'll make one for you!)

Every Sargent tool is tailor-made for **one** particular job. This means top performance . . . saving you time and money far beyond that of an ordinary "all purpose" tool.

If there isn't a Sargent tool that'll handle your job, we will make a "special" for you. Because of Sargent's unique component part construction "specials" are easily designed to fit your specifications.

SARGENT
hand tool division

SARGENT & COMPANY, New Haven 9, Conn. 22-F

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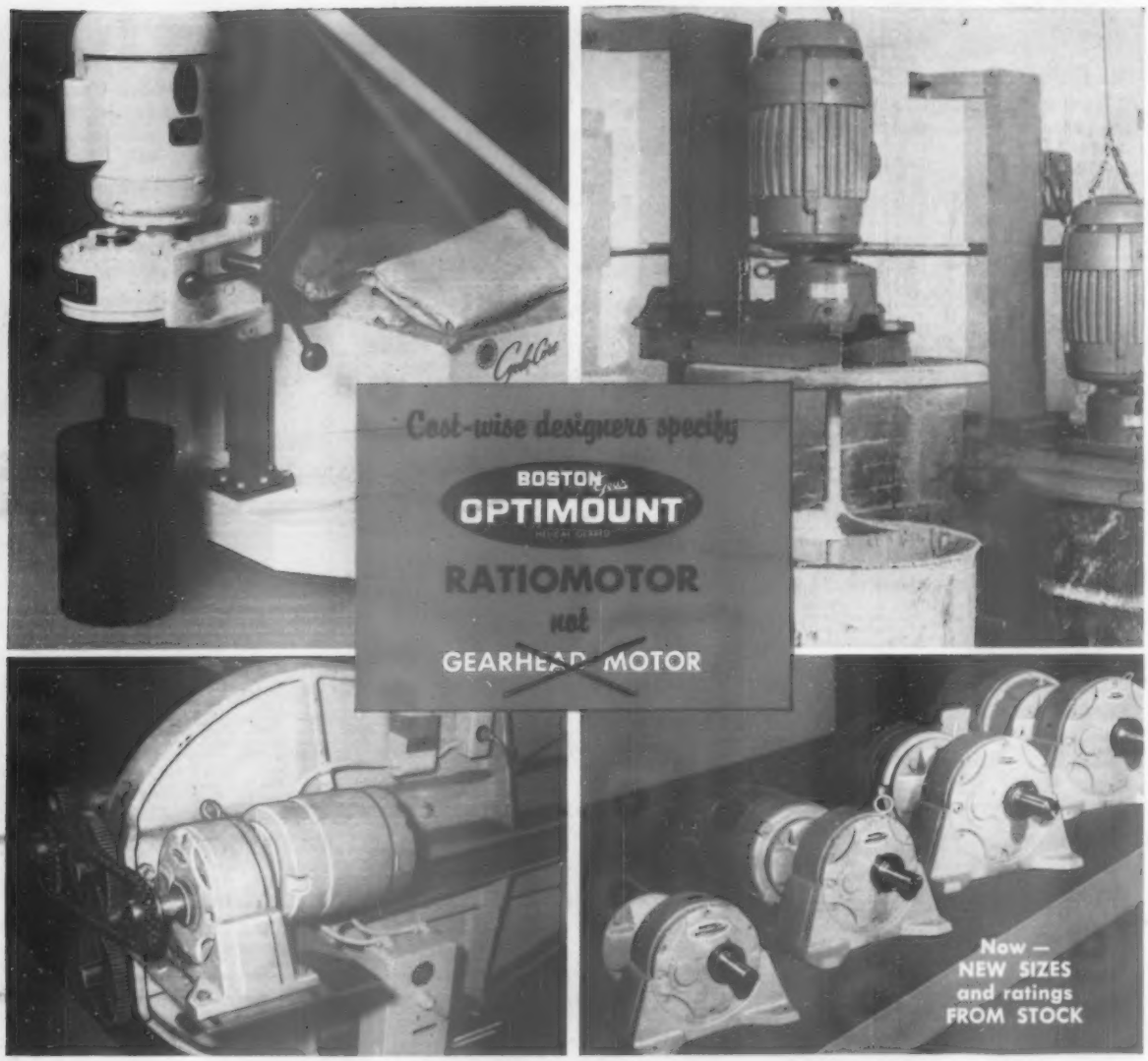

This simple change in specifications starts savings all along the line

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— *STANDARDIZATION PAYS* —

FACTORY

PLANT OPERATIONS CASE BOOK

HITCH-HIKE CONVEYOR

Circles plant for half a mile at 90 fpm.—
story on pages 184-85

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CASE BOOK

NORMAN H. SOLON, EDITOR

No. 32 June 1960

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Sequence Trays Oust Grab Bags

There's no fumbling for missing parts on the assembly line at Eclipse-Pioneer Division, Bendix Aviation Corporation's Teterboro, N.J., plant. The grab bag system has given way to sequence trays and effected a 15% direct labor savings.

The system starts in the warehouse area where parts are loaded into eggbox-type containers (bottom arrow) in the order in which they are to be used on the assembly line. Each tray has a sequence number.

Formerly, each part was put in an individual glassine envelope and then placed in a wooden bin (top arrow), usually in the above order sequence. The new system saves 12% in parts handling here alone.

The assembly-line worker now has no problems about where the next part is. He just reaches to the next slot in the egg-crate container. With the old wooden bin, he had to fumble for parts. As the operation continued, the parts lost all semblance of order. It became a slow hunt-and-pick system.

The egg crate also reduced the leadman's time by 20%—by minimizing worker's training and by easing the job of dispatching parts.

Swivel Boom Eases Handling

This plant-made removable swivel boom with grab attached to an electric fork elevator provides a fast and safe method for high-stacking heavy (750-lb.) barrels. At Automatic Electric Company, Northlake, Ill., one worker can install the boom on the elevator.

The barrel hand truck formerly used with the elevator required two men and involved movements that were hazardous, inefficient, and time-consuming.

Workers Aid Their Political Parties

Some 152,000 Ford Motor Company employees throughout the country have been urged to lend financial assistance to the political party of their choice. The company has asked workers to drop contributions into a collection box.

Each worker has received a letter of explanation, a contribution card, and inner and outer envelopes that assure contributions can be made in secrecy. It's the first time a company-sponsored program of this type has been undertaken.

The United Auto Workers has given the plan its backing.

Collection boxes have been placed in all Ford plants and offices, and the inner envelopes deposited by employees will be forwarded direct to the Democratic or Republican state committees.

The company emphasized that the program is completely non-partisan and not designed to counteract political activities by unions.

The plan is part of the company's Effective Citizenship Program, which includes the dissemination of information on the workings of the two-party system.

Infra-Red Gaging Battles Waste

High-speed infra-red gaging of hot metal is cutting down waste at Armco Steel Corporation, Butler, Pa. And the system is highly accurate at strip speeds up to 200 fpm. when edge heat is 900 F. or more. Even steam and oxide dust have no adverse effects.

The system (Weston Instruments Division of Daystrom, Inc., Newark, N.J.) is said to be the first in operation to measure steel width on a continuous basis.

Here's how it works: A heat-radiation gage operates from an infra-red sensing head mounted above the moving steel strip. It continuously scans every inch of width. Speed changes or sideway strip movements of as much as 3 inches on each side won't affect accuracy.

The sensing head is mounted in a water-cooled heavy steel housing about 14 feet above the strip bed. When the strip is running, the head continuously transmits measurement signals to console equipment for translation to visual indication at the finishing stand control station, speed pulpit, and roughing stands. The operator in the control pulpit can read any deviation from nominal width from plus or minus one inch on the meter. Measurements are accurate to ⅛ of an inch.

A floor-mounted main console houses all operating circuitry on unitized tilting chassis, as well as voltage regulating equipment.

When periodical calibration for the various sizes of strip is necessary, the gage head is positioned over a calibrating unit, which, in turn simulates various strip widths with infra-red lamps.

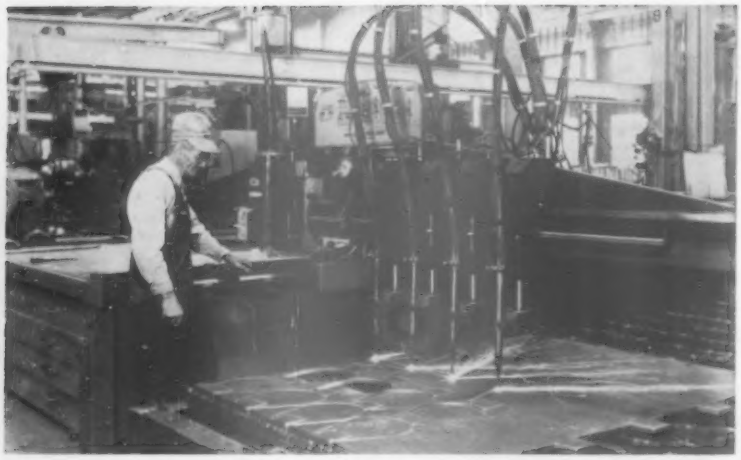
Tilting Storage

There's no need to do deep knee bends to reach the bottom pieces stored in 50-gal. drums at Hollaender Manufacturing Company's Cincinnati plant.

This tilted bin storage rack set up by the company does the trick. The drums can be stored in it at an angle, which gives easy access to the contents—even for parts that lie on the bottom.

THROWAWAY WIPERS PICK UP DOLLARS

Some $7000 a year has been cut from the budget of Frank G. Hough Company, Libertyville, Ill., by replacing rags with disposable wipers for cleaning and wiping operations. Laundry bill for rags used to run $150 a week. Another $250 a month was spent to replace lost rags. Now, at an annual cost of $1000, the disposable wipers are used by workers operating lathes, mills, drill presses, boring machines, hobs, shapers, grinders, and saws. With the wipers, workers clean parts and gages, wipe tools, clean surfaces of accumulated chips and fillings, wipe dirt off their hands. The lint-free cellulose wipers (Kimberly-Clark Corporation, Neenah, Wis.) have eliminated an average of eight trips a week by workers to the tool crib for rags.



4-in-1 Machine Reaps Savings

An electronically controlled multiple-torch shape cutter that follows an ordinary pencil-line drawing is reaping a saving of $10,000 annually at Parkersburg Rig and Reel Company, Coffeyville, Kan. The new cutter replaces four single-torch flame-cutting machines.

The old system required the use of aluminum-strip plywood-base templates. One draftsman worked full time making them. Now only one man spends less than half his time making some 25 paper templates per month. These are drawn in pencil on plain white paper, with the shape required represented in full scale. The paper templates can easily be stored in a drawer—their bulky wooden counterparts had to have special storage space. Today one man operates the automatic flame cutter with each of its four torches cutting about 15% faster than the single torch on the old machines.

The tracer on the automatic flame cutter (National Cylinder Gas Division of Chemetron Corporation, Chicago) consists of an electronic scanning device, a drive unit, and a control panel. The optical scanning system follows the center of any drawn line 0.04 inches wide, within 0.005 inches on either side of the scanned line, at speeds up to 25 inches per minute.

Purifying Air With Air

A pneumatic conveyor system has taken Stauffer Chemical Company, San Francisco, off the hooks of both irate neighborhood residents and its own employees.

Formerly, alkaline ore was received in box cars and unloaded by a small scoop-equipped truck that entered the car to do the job. The ore was scooped into a screw conveyor that fed it into a bucket elevator for delivery to a storage tank at the top of the plant. This open system allowed the dust to enter the atmosphere. It irritated not only the nasal membranes of the workers, but also the nerves and pockets of the community, since it played havoc with paint on houses and automobiles. And it caused considerable material loss in the plant itself.

With the new system, the ore is received in hopper cars. The bottom of one of the hoppers is opened and two flexible metal hoses are positioned on the pneumatic conveyor system (Fuller Company, Catasauqua, Pa.). The hoses attach to the ends of 5-in. conveyor ducts projecting from the side of the plant. The ducts join into one pipe into which the material is drawn by suction to the roof. There the ore is filtered and dropped into a closed storage bin in the basement.

Because the system is totally enclosed, air pollution is now nonexistent. Material loss has dropped. And the operation has been speeded up—one man can unload a full 60-ton hopper in four cars.

Skyscraper Lance

Here's a novel method for getting work done in high hard-to-reach factory areas. It's used for sandblasting furnace tubes at Standard Oil Company of Indiana's Whiting, Ind., refinery.

The mechanism consists of a 20-ft. lance, which has been threaded on one end to hold a sandblasting nozzle. A block and handline enables the assembly to ride a ½-in. cable stretched lengthwise across the top of the furnace.

The old system required planks to form a base for a scaffold that had to be erected each time the tubes were cleaned.

Hoards Heat

About $4000 in direct heating costs has been saved at Century Electric Company's new 109,000-sq.-ft. McMinnville, Tenn., plant. Reason: A water-repellent vermiculite fill was used during construction to insulate the brick cavity and concrete block walls of the building.

This means that only 10 gas-fired heaters of 1-million-Btu. capacity each are required. Without the insulation, 12 heaters would have been needed. The insulation is expected to effect further savings on gas consumption during the life of the building.

The combination of fill with brick cavity and concrete blocks provides completely insulated walls. Thus, Century is able to use the exposed concrete blocks as interior finish, eliminating the cost of additional finish materials.

Metal-Edge Filters Work Double Time

With the use of five metal-edge filters, American Chicle Company, New York City, is able to process about twice as much gum base as was possible with a filter press. The new filters have cut maintenance time and space needs, too.

The filters now screen particles as small as 0.005 of an inch. And the company is testing a custom filter that will stop contaminants as fine as 0.003 of an inch.

Formerly, the company had to shut the line down every hour to clean the filter press—a half-hour job. The metal-edge filters (Purolator Products, Inc., Rahway, N. J.) need only be cleaned every three hours—a 20-min. job. They're much smaller and easier to handle, leave more room on the platform to accommodate process requirements than the old filter press did.

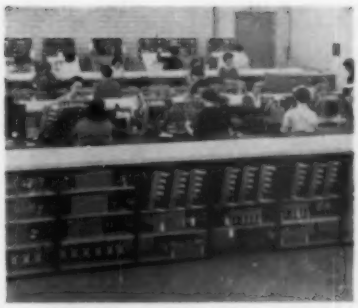
Filtration with the new filter is uniform because it's fixed accurately by a metal ribbon.

Silver Dollars Show Plant's Importance

Want to check on the actual effect of your plant's economic effect on the local community? You might try this plan. As part of its silver anniversary celebration, Bristol Manufacturing Corporation, Bristol, R.I., sent to Nevada for a supply of shiny new silver dollars.

One Friday each employee received the first $25 of his pay in shiny cartwheels in blue airline bags. The paymaster urged all workers to spend the silver as they would greenbacks. As a result, thousands of silver dollars began showing up in Rhode Island and Southern Massachusetts. Since silver dollars in this area are normally as common as snowstorms in Miami, the cartwheels pretty well pinpointed the economic influence of the plant.

Supermarkets ended up with most of the silver dollars. Only complaint came from local merchants who claimed their cash registers couldn't accommodate the coins.



Peaked Roofs Are Janitor's Delight

Here's a simple trick toward better housekeeping in production areas. These peaked-roof storage racks have considerably reduced dust accumulation at C. P. Clare & Company, Chicago. The peaks also prevent employees from using the tops of the racks for storage and cluttering the plant.

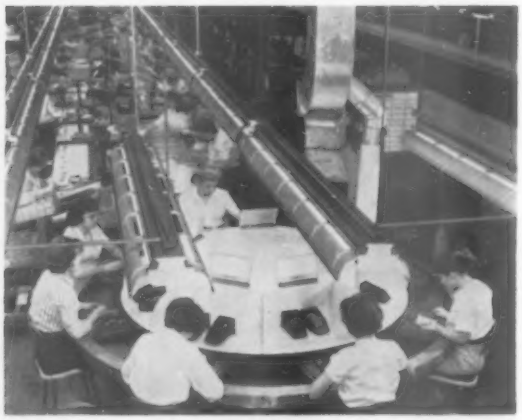
The efficient layout of the racks affords supervisors a complete view of the entire plant operation from any spot in the room.

SELF-DUMPING SYSTEM IS KIND TO BACKS

There's no manual labor in this dumping operation at Nestle Company's Marysville, Ohio, plant. It's all done by a hook-and-tilt system (Tote System, Inc., Beatrice, Neb.). The 200-lb.-capacity tote bin, which is built for fork-truck lifting, is carried to the tilting station. There it's inclined at a 45-deg. angle for full flow out of the contents. One man handles the entire operation. Formerly, 200-lb.-capacity barrels and 18,000-lb. tanks were used. It took three men to dump the barrels and special conveyor equipment to move and dump the tanks.

1. PACKING WITHOUT SOMERSAULTS.

2. PICKING WITHOUT STRAINING.



3. WORKING ALONGSIDE AUTOMATION.

4. HITCHING RIDES AROUND THE PLANT.

COVER PHOTO

Quartet of Plant Ideas Geared for Efficiency

A little ingenuity is the magic formula for transforming unnecessary operating expenses into black marks in the ledger. What's more, it's effective in any plant—guaranteed not to fail. At Motorola, Inc., Chicago, a measure of imagination combined with a generous dose of know-how has been parlayed into a highly efficient plant operation. The results are illustrated in the four typical examples that follow.

1. Flapping without flipping. This plant-made device drops a carton over a finished unit and closes one set of flaps. Job now requires one man instead of two.

The product is positioned on the roller-conveyor section of the flap closer. The operator actuates a control that positions a platform under the front and back edges of the item. The conveyor then drops away leaving the sides of the cabinet unobstructed. A carton is released by the operator from the overhead device (photo). As it drops, the flap opposite the operator is caught by a counter-balanced hook that pivots from the overhead framework. This hook allows the operator, unaided, to guide the carton over the product.

After the carton is in place, the operator activates a control to again raise the rollers, thus closing the two side flaps. The carton is then pushed into a chain-driven machine that

automatically closes the two remaining flaps.

2. Tilting device fights fatigue. These stands take the strain out of unloading large parts from a pallet box. They accommodate a standard pallet box and lift a maximum of 2500 pounds.

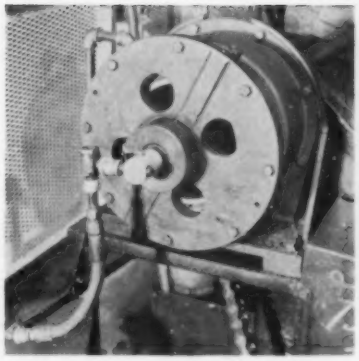
Loads are placed on the stand by fork truck. By pushbutton control the operator can raise the pallet box to any angle for unloading. As the supply of parts in the box is reduced, the operator can raise the box to its maximum tilt. This puts isolated parts on the bottom within easy reach.

3. Automation and assemblers trade off. This six-station turnstile assembly machine has four staffed and two automatic positions. At first station, a plated circuit board is placed into a specially designed pallet and a specified number of component parts are inserted into it. As the first operator completes her work cycle, the machine automatically indexes the board to the second operator who adds her complement of parts to the board. This process is repeated through the third and fourth stations. At the fifth station, a cup device containing flux is raised automatically to contact the bottom side of the board. This fluxes each of the component parts.

At the sixth station a similar cup containing solder is raised to handle all connections simultaneously. The machine is then indexed back to the first position where the finishing board is removed and placed on a conveyor that carries it through final assembly.

4. Circling the plant. This hitchhike conveyor system, about half a mile long, is the answer to handling large bulky packages in quantity throughout the plant. The towveyor moves at 90 fpm. and is routed through the warehouse area and around the perimeter of the final assembly department.

Empty cabinets are loaded on a towveyor truck in the warehouse. The truck is hooked onto the towveyor track and transported to the assembly area where it's unloaded and rehooked onto the track. Continuing along its route, the truck picks up finished goods and brings them to the warehouse. At this point the truck has completed its circular journey around the plant and is ready to begin another.



Air Brakes, Clutches Chuck Out Gremlins

Gremlins have been chucked out of butt hinge curling machines by means of air brakes and clutches at Frantz Manufacturing Company, Sterling, Ill. Cost of clutches and brakes: $500. Savings: an average of $2500 per year in time, labor, and production costs.

Formerly, the company used single-station manual controls, consisting of a foot brake and a long-handle clutch not easily accessible to the operator. The time lapse between an operating malfunction and the stopping of the machine often meant jamming, with damaged parts and broken tools. And additional mechanical operations requiring increased shaft speeds and more accurate power transmission control made the old system obsolete.

Drum-type air clutches and brakes (Fawick Corporation, Cleveland) mounted on the 6-ft. main drive shaft solved these problems. Now pushbutton controls are placed at strategic points around the machine.

The ease of operation for inching action in making set-ups and for emergency starting and stopping has increased all-around efficiency.

Green Light Means Perfect Weight

An electronic system that checks the weight of scrap going into a melting bucket has eliminated preweighing at General Steel Castings Corporation (Granite City, Ill.). Besides saving time, the new system pays off in greater uniformity from melt to melt.

The installation consists of a recorder (Leeds & Northrup Company, Philadelphia) for totaling scrap weight, digital control point setters, a weighing station, and a series of three signal lights.

The operator presets weights for the different types of scrap on the control point setters. Settings are cumulative. In a typical operation, Station 1 is set at 3000 pounds for 3000 pounds of scrap from one bin. Station 2 is then regulated at 6000 pounds to allow for an additional 3000 pounds from a second bin. Stations 3 through 6 are set up in the same pattern.

Once the control points are set and the charge bucket is in place, the crane operator begins loading the bucket with scrap from the first bin. The light changes from red to green when the preset weight of 3000 pounds is reached. If the operator loads more than 3000 pounds, light turns red again. The light allows a tolerance of plus or minus 25 pounds. A delay switch in the recorder flips to next control point setting when the operator is ready to load from the second bin.

Pivot-Hook Carrier Hugs Crates Tight

These 20,000-lb.-capacity carriers simplify the moving of long, heavy crates at Aacon Contracting Company, Inc., New York.

The carriers move over a crate that has been lifted by an air-operated platform. Then they pick it up by means of four forks—two on each side—which swing in to meet in the center. This forms two arms under the load.

The pivot-hook arrangement (Clark Equipment Company, Buchanan, Mich.) permits carrying loads without the bolsters usually required.

YOU BE THE ARBITRATOR

THE CASE OF

The Jealous Machine Operator

Out of the experience of the American Arbitration Association

Ralph M. was one of four "glueing" machine operators in a TV plant. All four were classified the same way, paid the same rate. Ralph, however, took pride in the fact that his was an extra-size machine and that he usually got a special line of cabinets to work on.

During the summer there was extra work on these cabinets and Ralph was asked to work overtime every night for a week or so. He declined, citing urgent personal reasons. Since the union contract gave him the right to refuse overtime, there was no dispute about that. But management decided it would be practical for Ralph to switch matchines with the man who *was* willing to work overtime.

"It's the big machine that will operate after the regular shift," the plant manager explained. "So it's logical for the man who will work on it overtime to be on it during the regular shift. Otherwise, we'd lose 15 minutes before he'd get working."

"That's a phony excuse," Ralph protested. "You know I have the right to refuse overtime. You're just trying to get back at me by taking me off my machine. You can't transfer me as a matter of discipline when I haven't done anything wrong."

Retorted the manager: "We have the right, under the management prerogative clause, to protect ourselves against loss of time."

Eventually the case went to arbitration. Suppose you were the arbitrator? How would you rule?

For the actual decision turn to page 194

Press Gives Misplaced Parts the Air

This plant-made safety interlock setup prevents the press from tripping in case the part is not located properly in the die.

The system in operation at Borg & Beck Division of Borg-Warner Corporation consists of a sensitive-type pressure switch, a variable orifice, and a pressure regulator. It works like this:

Air flow through the small orifice in the die is restricted by the part when it's properly seated. This creates a back pressure and energizes the pressure switch.

This system has considerably reduced the frequency of die breakage in the press. And it has cut repair costs 30%.

Source: M. D. Gabbert, Master Mechanic, Borg & Beck Division of Borg-Warner Corporation, Chicago.

Hi-Pressure Test Hunts Down Flaws

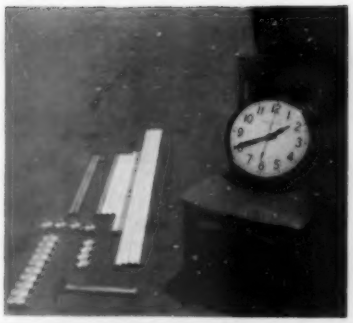
Castings at Philadelphia Bronze and Brass Corporation (Philadelphia) have to be hydrostatically tested at pressures averaging between 2500 and 5000 psi. And they must be tested in large volumes.

A full-time hydrostatic test department with special equipment for rapid high-pressure tests is doing the job.

The test equipment consists of a double-acting air-driven hydraulic pump, a universal clamping table, and a unique high-pressure test stand for small castings. The pump (Aldrich Pump Company, Allentown, Pa.) develops hydraulic pressure from 50 to 12,000 psi., and is operated by 90-psi. plant air.

Castings over 14 inches are clamped to the universal table and connected to the pump with high-pressure flexible hoses. Smaller castings are checked in the plant-made test stand. This device consists of a stand with rubber-cushioned steel bottom and top plates. The stand is connected to a 50-ton hydraulic jack. The casting is placed on the bottom plate (through which water enters) and the top plate is lowered on its guide rods and clamped fast with the jack.

Reprints of the Plant Operating Case Book are available. Price 50¢. For quantity prices, write Reader Service Department, FACTORY, 330 W. 42nd St., New York 36.



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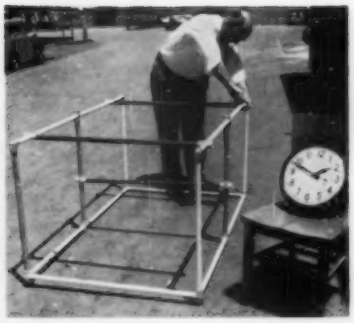

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Quick-Change Fixtures Work Like Erector Set

It takes just 10 minutes to construct this fixture from ordinary pipe at Ryan Aeronautical Company, San Diego, Calif. Material and parts handling at the plant is being revolutionized by fixtures that can be disassembled and given new shapes in few minutes' time.

Formerly, storage and handling fixtures at Ryan were of welded steel construction, which lacked flexibility and versatility. When a fixture is welded, it becomes a permanent unit that goes into limbo after its primary function has been fulfilled. Its parts can be re-used only after the structure has been painstakingly cut apart, and the new fixture rebuilt on the basis of a complete redesign.

The rack in the photos above is assembled by using the erector-set principle. The pipe is fastened together at the joints by screw-hold rail fittings. The only tools required are a hammer and wrench. The racks can accommodate all sizes of curved channel sections.

To achieve mobility the completed racks are placed on angle-iron dollies surmounted with strips of polyethylene foam to eliminate vibration and dampen noise in movement.

Thinking Automation

Here's a gimmick that Westinghouse Electric Corporation, Pittsburgh, designed to stimulate its manufacturing managers into thinking about automatic methods.

Each manager was sent a plastic name-plate produced completely by automation at Westinghouse. This conversation piece was made from start to finish in 15 minutes.

To start the process, the required initials were typewritten at a computer. No drawings or knowledge of the cutting sequence were needed. The computer determined the path of the tool and produced a punched control tape that fed into the machine control console. Next, the plates were cut automatically on a profile-milling machine—a conventional vertical mill that's re-fitted with numerical control of three axes. Full machine use was achieved since the computer had determined sequence and running time. The operator had only to press a button.

The name-plate was then immersed in a bath of dry paint powder. Finally, it was packaged by a process in which a laminated polyethylene film was heated and vacuum-formed over the part.

Westinghouse predicts that this type of an integrated manufacturing system will be in general use by 1965 or earlier.

T-SHAPED ALUMINUM

There are no material-handling problems with aluminum ingots at Kaiser Aluminum & Chemical Corporation's Mead, Wash., plant. Ingots are made in T-shapes, can be moved easily by standard fork truck.

25-Mile Voice

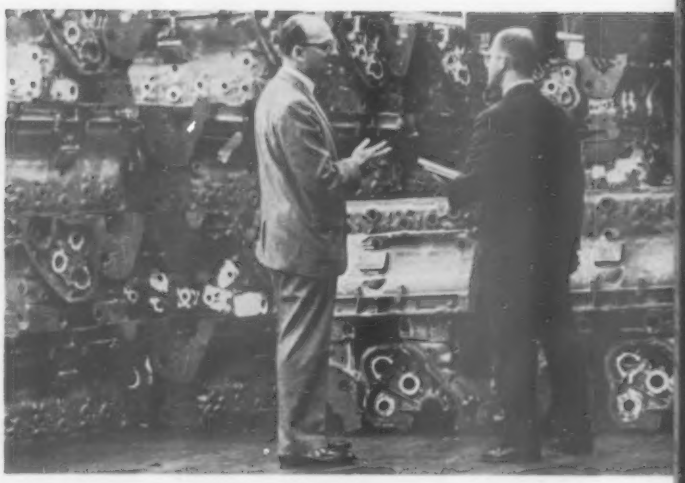
A three-way security communications system is in operation at Minneapolis-Honeywell Regulator Company, Minneapolis. Guards carry a slimmed-down, lightweight version of a walkie-talkie radio-telephonic transmitter. The compact unit weighs just over one pound.

Equipped with this device, a guard is in constant contact with a mother unit at the guard desk. There's another set similar to the desk unit in the plant messenger car, with an aerial on the roof of the building.

In this way the system—within a 25-mile range—affords an efficient three-way transmitting and receiving hook-up for desk, car, and guards on their rounds.

Spotting a fire recently, a guard reported it to the desk in seconds through his walkie-talkie. The desk relayed the alarm to the fire department and stationed a second guard with a walkie-talkie on the street. He kept in touch with the guard at the scene of the blaze, gave the firemen its exact location, as well as information on its type and size.

Four-Step Program Pays Off With a Cleaner Plant



1. Surveying the plant . . .

2. Working out a program

3. Training personnel

A little bit of organization has caused a big revolution in housekeeping methods at the Plainfield, N. J., plant of Mack Trucks, Inc. The company recently instituted a formal four-phase program replacing the old catch-as-catch-can method. The results tell the story.

The program has been under way for only a short time, but already has produced a 15% rise in standards with no increase in manpower or expenses. Another 15% increase is expected when the full potential of the system is realized.

Under the old method, the overall responsibility for housekeeping was in the hands of the plant engineer. To get the job done, 87 people had to be assigned to custodial duties (the largest group on the first shift, the smallest group on the third). But lack of adequate supervision, delegation of supervisory responsibilities, and proper distribution of the custodial work load brought problems. Housekeeping workers were frequently called on by departments to handle so-called emergency tasks that were completely removed from their main duties. As a result, many areas were deprived of custodial help.

Also, there was no adequate provision for orderly distribution of supplies. Considerable time was lost while workers went great distances for items such as clean water and mop-washing facilities.

The new system, devised in conjunction with Puritan Chemical Company, Atlanta, Ga., was put into operation in four steps:

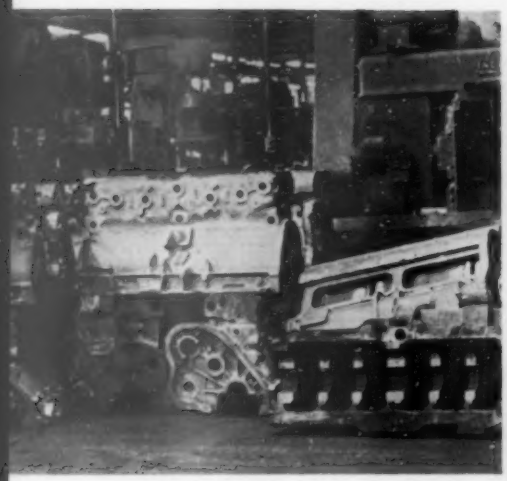
1. Survey of the premises. This provided information that enabled management to fix proper standards, work assignments, and work loads. It also produced a backlog of data that helped it decide on material and personnel needs.

2. Preparation of program. All jobs were detailed and recommendations were made for proper organization and assignment of responsibility. Correct cleaning procedures were spelled out.

3. Installation of program. This was primarily a training phase aimed at giving supervisors and custodians a full understanding of the responsibilities as well as of the mechanics of the job.

4. Inspection. A regular inspection system was established whereby each area is compared against preset standards. If an area is below par, corrective measures are recommended involving one or all of the following: men, machines, materials, or methods.

Key to the new system was the reorganization of the housekeeping department. A general foreman, reporting directly to the plant engineer, was assigned full-time respon-



4. Inspecting results

sibility for housekeeping and its directly related functions. Under the previous set-up, a general maintenance foreman handled this task on a part-time basis.

The majority of custodial personnel were switched over to the third shift. Only a skeleton staff of three men remain on the second shift while 27 are assigned to the first. The staff is supervised by one day and two night shift foremen (one for plant and one for office housekeeping). In addition, there are three group leaders for sweeping on the night shift. This allows the assignment to be carried out with minimum disruption of productive work and provides closer supervision for the staff.

Maintenance supplies are now centralized near the receiving department. And walk-in storage closets with utility sinks and small custodial cabinets have been installed in key production and office areas throughout the plant.

Perhaps the most important feature is that each housekeeping task has been defined and the responsibility for it pinpointed.

Source: Thomas A. Simms, Plant Engineer, Mack Trucks, Inc., Plainfield, N. J.

Taking Tech Grads Out of the Clouds

Finding that the bright young engineering graduate you hired has just too much of a blue-sky education? And no training in the everyday routine of a job? Chance Vought Aircraft, Inc., Dallas, is doing something about this problem.

The company sponsors 50 top high-school students each year at the school of engineering at Arlington State College (Texas). The plan calls for a student to alternate semesters, spending one in the classroom, the other at CV's plant. To qualify, a student must graduate from high school with top grades, continue with a high scholastic average in college. The money earned during his working semester is expected to finance his tuition.

The student who completes this five-year program should have a thorough academic education plus practical job experience. The company, of course, retains as many of the brighter prospects as possible.

HELPING TIRED FEET

Engineers and draftsmen at General Motors Corporation's Linden, N. J., plant can now sit during their lengthy conferences over the drawing board. The benches were built and upholstered in the shop to end complaints about tired feet.

CASE BOOK CAPSULES

Pirating skilled watchmakers is becoming a necessity for the country's missile instrument makers, says Colvin Laboratories, Inc., East Orange, N. J. Reason: They are best qualified to meet the demand for closer tolerances and greater accuracy.

Aluminum can be hard-coated 10 to 50 times faster under a system devised by Toro Mfg. Corp., Minneapolis. The new method can use high-current densities without burning the aluminum.

Rubber coating, specially designed by U. S. Rubber Co., New York City, permits vessels to travel faster without any increase in power. It reduces the turbulence that is normally created as an object moves through water.

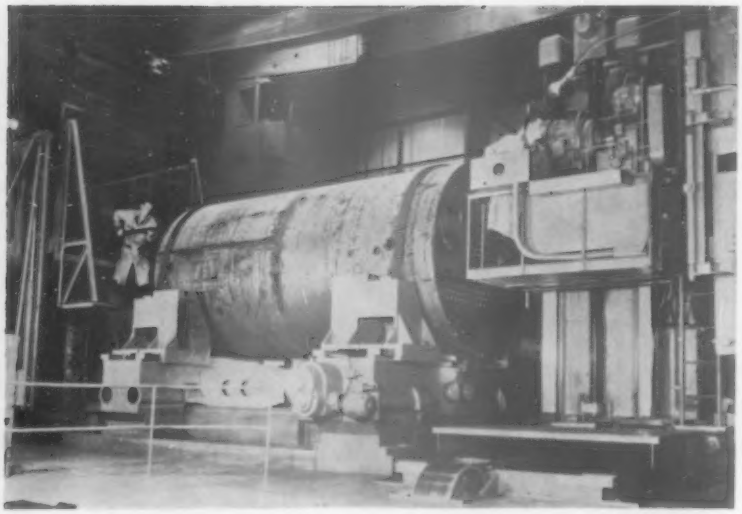
A hypersonic wind tunnel that will tolerate blasts of air at speeds ranging from 4500 to 7600 mph. will soon be completed at Douglas Aircraft Co., Inc., Santa Monica, Calif.

More than half of all equipment leases now being written are with small businesses where total assets are less than $500,000, according to Nationwide Leasing Co., Chicago. The average term of a lease is 3.7 years.

An ore bucket weighing 35,520 pounds and capable of handling 20¼ tons is being constructed by Blaw-Knox Co., Pittsburgh, for U. S. Steel Corp.'s Mobile, Ala., terminal.

Human relations and administration problems facing top industrial, business, and government organizations will be analyzed at a workshop at the University of California's Santa Barbara campus, June 15 to 18.

A portable water-softening unit that can remove impurities from hard water at a rate of 2 gallons an hour has been invented at New Mexico Institute of Mining and Technology, Socorro, N. M.



100-TON BOILERMAKER DOES WORK OF 22 MEN

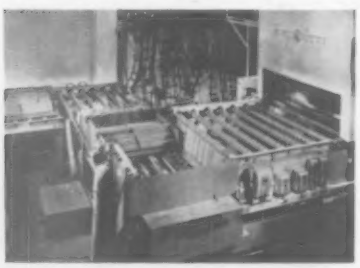
Three men working with this machine can do the same amount of work faster than was formerly done by 25 workers at Cleaver-Brooks Company, Milwaukee. The photo-electrically controlled Boilermaker (Ingersoll Milling Machine Company, Rockford, Ill.) automatically lays out, trepans, and chamfers the flue holes in the two ends of the boiler. After a worker inserts the flues, the machine flares the ends and beads them into position. Key to the operation: Four photoelectric cells that scan a master chart of black dots (representing flue holes) on a white background. Any boiler from 50 to 600 hp. can be worked on with the Boilermaker.

Locking Screws Save Overtime

Loose bolts on a 1000-ton press were playing havoc with maintenance costs at Prosperity Company, Syracuse, N. Y. If the bolts were tightened during regular hours, it meant interrupting production and considerable press downtime. So men had to work on Saturday to cinch down all fasteners.

Self-locking cap screws solved the problem. A nylon pellet seated in a small recess near the fastener point compresses as the screw is inserted in a tapped hole or nut. This forces mating threads together for gripping. It holds tight despite considerable shock and vibration.

Using these screws (Standard Pressed Steel Company, Jenkintown, Pa.) the company was able to eliminate the overtime tightening work. A tightening-up once every five months now suffices.



Elevator Takes Parts Down a Peg

Here's a trick to solve the problem posed when the height of a conveyor coming out of an annealing furnace doesn't match that of the general plant conveyor. Magnetic Metals Company, Camden, N. J., has a system that works this way:

Transfer laminations coming out of the furnace trip a spring wire. This wire operates a switch that, in turn, controls a solenoid-type relay. This activates a pneumatic elevator and also stops the conveyor at that point. The elevator lowers the lamination to the general conveyor and then returns to position. This starts the conveyor moving again. The elevator is normally operated by the plant's supply of compressed air, but the large air cylinder in the foreground is used as a standby in case of emergency.

This system eliminates the need for manually lowering each heavy lamination to the general conveyor.

Turning to Tiny Tolerances

A home-made precision turning device is the key to quantity production of extremely accurate electronic computer memory drums at Librascope Division, General Precision, Inc. (Glendale, Calif.). The drums are machined to tolerances of 5/100,000 of an inch.

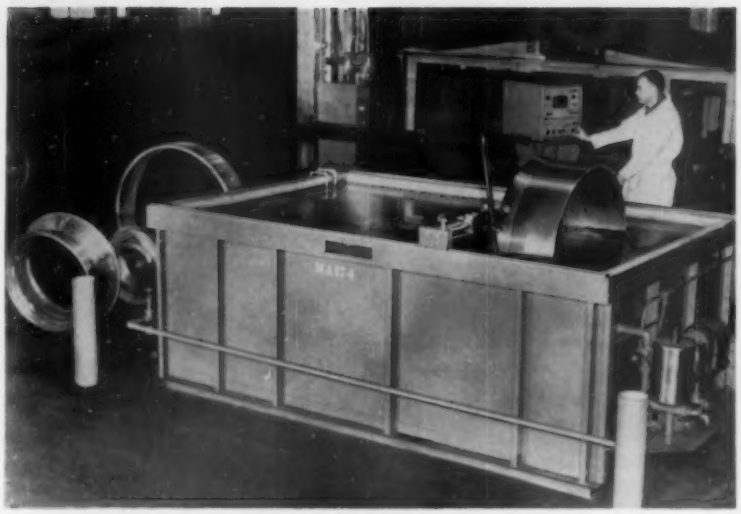
A precision lathe-and-saddle fixture was used formerly. However, because of the need for exact tolerances, the complicated construction of this fixture was a drawback. It hindered quantity production and made it difficult to change from one type of drum to another.

The new machine can finish drums from 4¼ to 7½ inches in diameter and up to 14 inches in length. Tool-feed speeds vary from ¼ inch to 5 inches per minute. A

1-hp. 220-volt enclosed motor provides a speed range of from 600 to 5850 rpm. and drives thin belts that rotate the drums. This permits turning of certain drums at their designated operating speeds.

A pneumatic cylinder drives the tool holder. And control of the oil flow from a hydrocheck cylinder regulates tool-holder traverse speed.

The machine is mounted on a 24x36-in. drill-press table. The table was scraped and precision hand-lapped before assembly to provide accurate mounting surfaces for all fixtures. Air conditioning in the shop area keeps the machine at a fixed temperature.



ULTRASONIC DICK TRACY SPOTS TINY FLAWS

A recently installed ultrasonic immersion testing facility can spot internal defects as small as 1/64 of an inch in a cross-section of steel shapes at Baldwin-Lima-Hamilton Corporation's Burnham, Pa., plant. This compares with the 1/16-in. maximum under conventional contact-type tests. The machine (Curtiss-Wright Corporation, Princeton, N. J.) consists of an immersion tank with traveling bridge and scanner, search tube and manipulator, and electronic control and indication equipment. It generates an electrical impulse that's transformed into an ultrasonic signal. Portions of that signal are reflected off flaws in the steel.

Furnace Rooms Are for the Birds

The wise old owl on the posters of the National Safety Council has been making the country safety-conscious for the past few years. However, one live not-so-wise owl is now a living symbol of safety at Libby, McNeill & Libby, Chicago.

The bird went a trifle off course while looking for a nearby forest, and found himself trapped in the boiler room of the plant.

Captured, the hooter has been caged and now is the personification of the plant's safety program.

COMING—JULY CASEBOOK

Read how General Radio Corporation spends pennies to save dollars on its manufacturing operations. The key: Invent special tools to fit the job and revamp old machines to do new tasks.

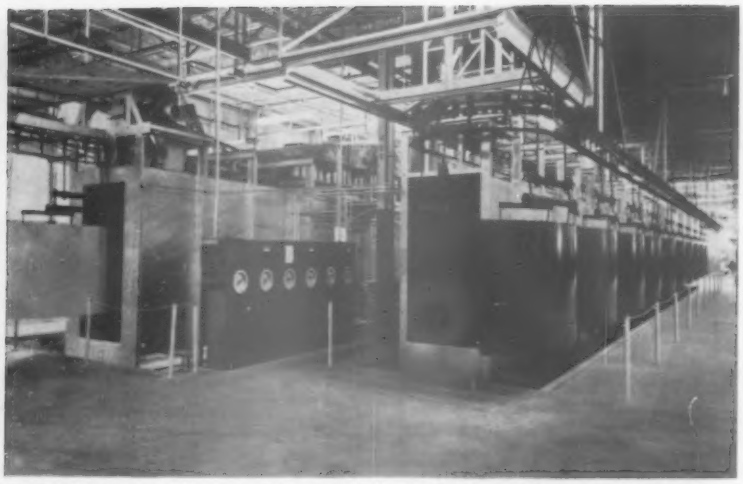
Package Pumps Mean Cool Savings

Package-type heat pumps both heat and cool the new research and development center of Atomics International Division (North American Aviation, Inc., Canoga Park, Calif.). Twenty-eight pumps are installed on the roof where they take up no valuable space and are easy to maintain. Total capacity of the system is over 400 tons.

Cost of the pumps was $200,000 less than that of a conventional two-duct high-velocity system for the 200,000-sq.-ft. building.

The new system, designed by Albert C. Martin and Associates (Los Angeles), eliminates the need for cooling towers. It facilitates the conversion of building space from one use to another (such as from laboratory to office) without causing air-conditioning problems. And satisfies standards for toxicity, fume control, and radioactivity.

Since security is a factor at the plant, the outside location of the pumps eliminates the need for clearances for maintenance personnel. And maintenance crews don't interfere with work going on inside.



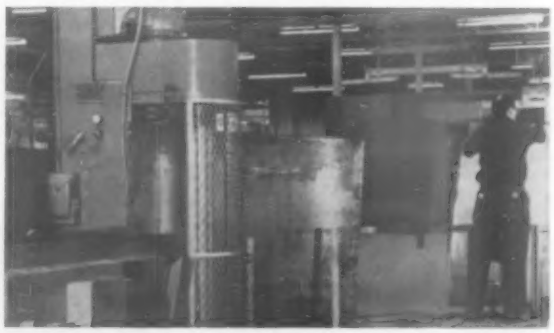
GIANT OVEN. Sheets are sprayed with liquid glass, then fired for 10 minutes at temperatures up to 1520 F. during trips through this 180-ft. U-shaped furnace.

SUCTION STACKING. Suction cups are used to stack sheets on skids for storage.

Half-Mile Conveyor Leads to Triple Output

Tripling production without increasing labor costs needn't be an efficiency expert's pipe dream. Effective planning by top management has made it a reality at A. O. Smith Corporation's Kankakee, Ill., plant. A completely automated production line for the fusing of glass to steel—part of a recently built $2-million plant addition—does the job.

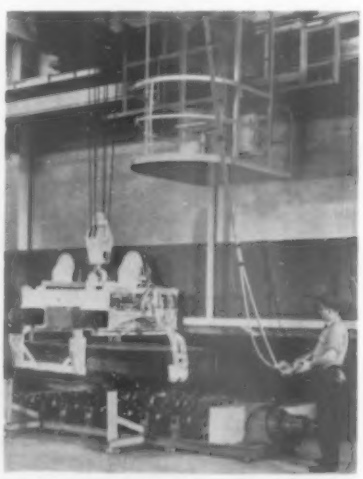
Heart of the system is an overhead conveyor line—over half-a-mile long—that winds its way through steel forming, washing, grit blasting, liquid glass spraying booths, drying ovens, and furnace. Not one additional employee is needed to handle the expanded operation. Photos and captions give six examples of how improved material-handling and production methods made an operation more efficient.



AUTOMATIC FORMING. Sheets are formed to an 8½-ft. radius, processed by two pinch rollers and wedge-shaped shoe.

TWIST-OF-THE-WRIST. Steel sheets leaving the drier are easily switched from the spray conveyor to a furnace conveyor with a manual hook transferring device.

CONTOUR SPRAYING. An even glass coating is applied to the sheets with spray-nozzle assembly that follows contour up and down, and left to right in a semi-circle.



TWO-WAY CONTROL. Operator has pushbutton control of a 10-ton overhead crane either on floor level or from an overhead seat that overlooks production area.

Blast Cleaning Blasts Costs

A blast cleaning machine, costing about $6000, has cut cleaning costs by $8600 a year at Compton Foundry, Compton, Calif.

Before installing the machine, two full-time workers and one on half time were required to handle the casting cleaning job. Now one man can handle it. Abrasive costs were cut from $200 to $70 a month due to faster and more efficient cleaning. And maintenance costs were sliced from $150 to $70 a month.

Quality of cleaning has also improved. Result: easier inspection and a better product.

The blast cleaning machine (Pangborn Corporation, Hagerstown, Md.) handles castings weighing anywhere from one pound up to 2½ tons. It operates by centrifugal force, hurling 50,000 pounds of metallic abrasive per hour. The machine cleans and recycles abrasives and is sealed to prevent loss.

Color as a Tool

Color—far from serving decorative purposes only—is an actual tool of management at Amana Refrigeration, Inc., Amana, Iowa. It boosts morale, promotes safety consciousness, reduces nervous tension and eyestrain, increases efficiency, cuts waste. Here's how planned use of color and lighting paid off multiple benefits at Amana:

Prior to its new color plan, the plant was finished almost entirely in gray. This color concealed dirt, made housekeeping difficult. The present bright color scheme reveals dirt as it forms.

A special shade of yellow is the color that warns workers of potential hazards. It appears in the press room, where constant caution is required, and on all movable machinery parts. Use of the same warning color extends to safety signs and material-handling trucks, but these are a slightly different shade to distinguish them from stationary equipment.

Key production and inspection areas, such as test booths, are painted in red to attract the attention of visitors.

Most plants paint their inside pipelines different colors to identify their contents. However, Amana wanted to create a pleasant atmosphere by having these colors compatible with one another and with the machinery and walls.

Every effort has been made to eliminate gloomy areas. Overhead aluminum screens designed to catch anything that might drop from conveyor belts gave a depressing spiderweb effect. A bit of aluminum paint made them bright and cheerful. The cafeteria, designed as a showplace to attract and keep workers, was painted to give it a restrained holiday air. The over-all color plan is a harmonious progression of changing colors to eliminate the feeling of monotony that can affect a plant's efficiency. Shades of medium-light green with contrasting areas of deep red at one end of the plant, progress through beige, soft yellow, and blue to the other end.

Exotic Metal Pail Doesn't Burn Out

An exotic metal-alloy parts container used for a variety of heat-treating operations has more than double the life of its high-alloy steel predecessor. It has been in service 26 months at Metallurgical Processing Company, Warren, Mich., has only had to be repaired by welding once. And it shows little evidence of warping or distortion.

The life span of these high-alloy steel containers in the past averaged just one year, and they have had to be reshaped and welded several times during that period.

The container is used for carburizing, carbonitriding, atmosphere hardening, and annealing. In the first three processes the container and its contents are quenched in oil after passing through the furnace. Most heat-treating operations are carried out in a temperature range from 1400 to 1700 F.

The Hastelloy Alloy X container (Haynes Stellite Company, Division of Union Carbide Corporation, Kokomo, Ind.) resists oxidation, thermal shock, and the embrittling effects of furnace atmospheres.

Hardboard Takes More Punishment

Kiln doors of hardboard are proving more durable than natural wood at Weyerhaeuser Company's Klamath Falls, Ore., plant. And cost is just half that for wooden doors.

The pitchy pinewood doors formerly used were weakened by the kiln's high humidity and temperatures ranging up to 200 F. Another disadvantage was that they were often sprung or damaged beyond repair when butted by loads of lumber.

The hardboard doors show much greater resistance to abrasion and moisture. Also, a broken panel can easily be replaced by slipping the new panel into the steel door frame.

CHEMICAL KO'S ALGAE IN COOLING TOWER

Sodium pentachlorophenate has proved the answer to protection of this cooling tower against algae and slime at Dow Chemical Company's Freeport, Tex., plant. The giant three-unit tower contains a total of 2-million gallons of water. Chlorine was used formerly, but results were far from satisfactory. Algae control was difficult and mist eliminators required hand cleaning at least once a year. Further, the chlorine softened the wood. Use of the less costly non-oxidizing sodium pentachlorophenate eliminated all signs of algae after 24 hours, and provided actual surface protection. This contrasts with the delignification chlorine hazard.

YOU BE THE ARBITRATOR

Continued from page 186

The award—The arbitrator wasn't convinced that more than a minute or two had to be lost in shifting a man from one machine to another for overtime. Men who quit 15 minutes early without justification could be disciplined. But the company couldn't transfer Ralph, who hadn't violated working rules, from his regular machine without a better excuse.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony and other facts involved.

Inflated Balloons—Deflated Costs

Ordinary air balloons have made the use of Argon gas economically feasible for welding at Cleveland Electric Illuminating Company's Avon Lake, Ohio, power plant.

Expansion necessitated the use of tungsten inert gas welds (Union Carbide Corporation, New York) in stainless steel steam and reheat piping. To provide inert gas shielding within the pipe, two balloons were inflated, one on each side of the joint. Argon was then pumped in to displace the air, protecting the weld from contamination.

The balloons inflated tightly against the inner wall of the pipe. This blocked gas flow, keeping Argon cost to a minimum. A consumable inert ring was then welded between the abutting pipe sections to insure a tight weld.

Red Means Go-Go-Go

Unlike traffic lights, red means go-really-go at Convair Division of General Dynamic Corporation's San Diego, Calif., plant.

Hot parts needed in a hurry are rushed on fire-engine red skids to assembly areas. Priority orders, which push the button on rush runs, are put in special red-backed plastic envelopes to distinguish them.

Superintendents in major assembly areas and general foremen of manufacturing control have the authority to call for the red-carpet rush service. They submit daily lists of urgently needed items to the fabrication superintendent and manufacturing control general foreman.

Orders are then given immediate attention in fabrication, and parts sent on their way, hand-serviced from area to area by production control dispatchers.

Spraying Plastic With Air Guns

Use of air guns instead of brushes for plastic repair work at DC Reinforced Plastics Company, Denver, has considerably improved product quality. And has reduced clean-up time as well.

Resins are thinned down 10 to 15% with acetone. When using the air gun the operator holds it as far away as possible from the work. This tends to dissipate the acetone and retain the original viscosity.

The Wren air guns are manufactured by Brinks Manufacturing Company, Chicago.

first in silicones

Dow Corning

SILICONE NEWS

production and maintenance edition • No. 35

BLANKET SOLUTION TO BIG PROBLEM

Looking for an economical way to produce large parts of complex shapes and configurations in small quantity runs? The story behind this picture may suggest a cost-saving solution.

Goodyear Aircraft of Akron is fabricating radomes for the Ballistic Missile Early Warning System. These radomes, 140 feet in diameter, consist of pentagonal and hexagonal panels which go together to form a truncated sphere. Panels are of sandwich construction, using paper honeycomb core and polyester resin laminate skins. Sandwich is cured under vacuum pressure and heat.

Using conventional methods, with the quantity of molds required to accomplish the job, much oven capacity would have been required. This would involve tremendous capital investment. Time and space requirements would be excessive, too.

Goodyear's solution: Stationary molds, internally heated to cure one side of the sandwich panel . . . a flexible heating blanket made of Silastic®, Dow Corning's Silicone rubber, to cure the other side.

Produced by Briscoe Manufacturing Company, Columbus, Ohio, blankets 7′ by 7′ were supplied to Goodyear without delay. The good flexibility of Silastic allows each blanket to conform to the contour of any mold or pattern. The good dielectric properties of Silastic eliminate any problems of wiring the electrical circuits in the blanket. Temperatures from about 275 to 375 F, are controlled easily and accurately.

The blanket of Silastic is easy to handle, requires little space for storage and can be re-used indefinitely. The need for costly handling equipment and different types of molds is eliminated. Ten of the blankets are now in service at Goodyear.

Could the versatility of silicone rubber blankets help you meet a molding or heating problem? Remember Silastic . *No. 647*

Same Motors, More Power

Production going up at your plant? That means you'll be in need of more power. Here's an economical, easy way to get it.

At a southern refinery, drives originally applied to centrifugal pumps were 350 BHP, 600 RPM synchronous speed Westinghouse motors designed for 75°C rise. An increase in process loads demanded additional circulation from the pumps. That meant more powerful motors had to be installed to handle the load. Or did it? Extra power could be obtained in a simpler, less costly way with motor stator windings rebuilt by Westinghouse.

As a result of revising the motor windings . . . and using Dow Corning silicone insulation, motors now operate at 720 RPM synchronous speed with 115°C rise. They give the power that's needed and the refinery saved a substantial amount by having them rewound rather than replaced.

Silicones, because of their excellent heat stability, allow motors to work harder . . . give them more power per pound. Silicone insulation can up-rate horsepower as much as 50%!

Many other plants have found that rewinding motors with Dow Corning silicone insulation has saved a good deal of new-motor money. If you're planning to boost operating schedules, take a look at what silicone rewinds can do . . . . . *No. 648*

NEW PAINT CUTS COSTS

Here's a job-proved way to cut those soaring paint maintenance costs: Use a silicone-based paint on all heat-and-weather-menaced surfaces.

Protective coatings based on Dow Corning silicone resins last from 25% to 100% longer. Gloss, color and film integrity are locked-in; heat, weather *(Cont. Pg. 2)*

LASTING LUBRICATION

Ford Motor Company solved a tough lubrication problem with a heat-stable silicone grease. That was in 1948. Today, Ford uses the same grease in the same application. Here's the history.

An oven conveyor system at Ford's Dearborn, Michigan, plant is made up of 1200 trolley bearings and four six-inch roller bearings. A number of these conveyor systems are needed to carry engine block castings into ovens for baking. Every 2½ hours out of a 4-hour period the trolley bearings are subjected to heat of 700 F. Lubricated with the best organic greases, the bearings seized frequently. Surfaces flattened, production stopped.

Since 1948 there have been no lubrication problems. That was the year a silicone lubricant — Dow Corning 41 Grease — was first applied. The trolley bearings need to be relubricated but once a week, the oven bearings, once a month.

Silicone lubricants are serviceable in extremes of cold and heat . . . on metal, plastic or rubber parts. Give a Dow Corning silicone lubricant a test next time your plant is faced with a problem of lubrication. Could that be today? . . . *No. 649*

NEW PAINT *(Cont.)*

and corrosion are locked-out. Repainting sessions are fewer, far between. This is especially important when hard-to-get-at spots are involved . . . when hot-running equipment must be shut-down for painting.

Paints based on silicones are now available for use at temperatures up to 1000 F. If high temperature is not the major problem but weathering and corrosion take a quick toll, silicone-based paints give the protection that's needed there, too. You can carry color-coding systems onto virtually all types of equipment without worrying about early paint failure.

Learn what silicone paints will do for your plant. Write for the factual illustrated brochure, "Why Silicone-Based Paints Mean Less Maintenance". It also contains a handy selector chart to help you select the best type of paint for your particular service temperatures and painting schedules. Included with the brochure is a list of suppliers of silicone-based protective coatings . . . . . *No. 650*

new literature and technical data on silicones

The Story on the Strong Bond Now Possible— Silastic 140 Adhesive is the new ready-to-use silicone product that effectively bonds silicone rubber to virtually any other material — glass and glass cloth, aluminum copper and steel, plastics, and silicone laminates or rubber. Neither heat nor pressure is required to form a firm, heat-stable bond that's also resistant to water and oils. For information on bond strength of Silastic 140 Adhesive or how to use it . *No. 651*

Cuts Processing Time — Syl-off®, the Dow Corning anti-adhesive silicone coatings for paper and paper products "releases time." Syl-off coated interleaving and packaging materials come away quickly, cleanly from even the stickiest products —speed handling of asphalt, latex, unvulcanized rubber, adhesives, candy, gum foods and other sticky products. A four page brochure outlines how costs are cut, time saved and waste reduced through the use of Syl-off coated processing and packaging materials . . . . . *No. 652*

Guide to Silicones and Their Uses — A 16-page, up-to-the-minute compilation of the forms, properties, and applications of Dow Corning Silicones summarizes how these versatile materials help engineers keep production moving—how they help to keep maintenance and downtime to a minimum. Send for your copy of this valuable reference . . *No. 653*

Silicone Insulator Protector — How to protect pole line insulators and electrical equipment bushings against excessive leakage, flashovers, and service interruptions resulting from contaminated atmospheres or wet conditions is explained in a new four page brochure. Action photographs show how Dow Corning 5 Compound prevents the formation of conductive paths. Write for . . . . . *No. 654*

Stops Foam — Joining the family of Dow Corning defoamers is Antifoam C, a water-dilutable silicone emulsion effective in processing both foods and industrial products.
The use of Antifoam C at the prescribed level is permissible under the 1958 Food Additives Amendment of the Federal Food, Drug and Cosmetic Act. Stable, quick-acting Antifoam C holds down foam, increases production capacity, eliminates shutdowns necessary to let foam settle . . . ups production profits . . . . . *No. 655*

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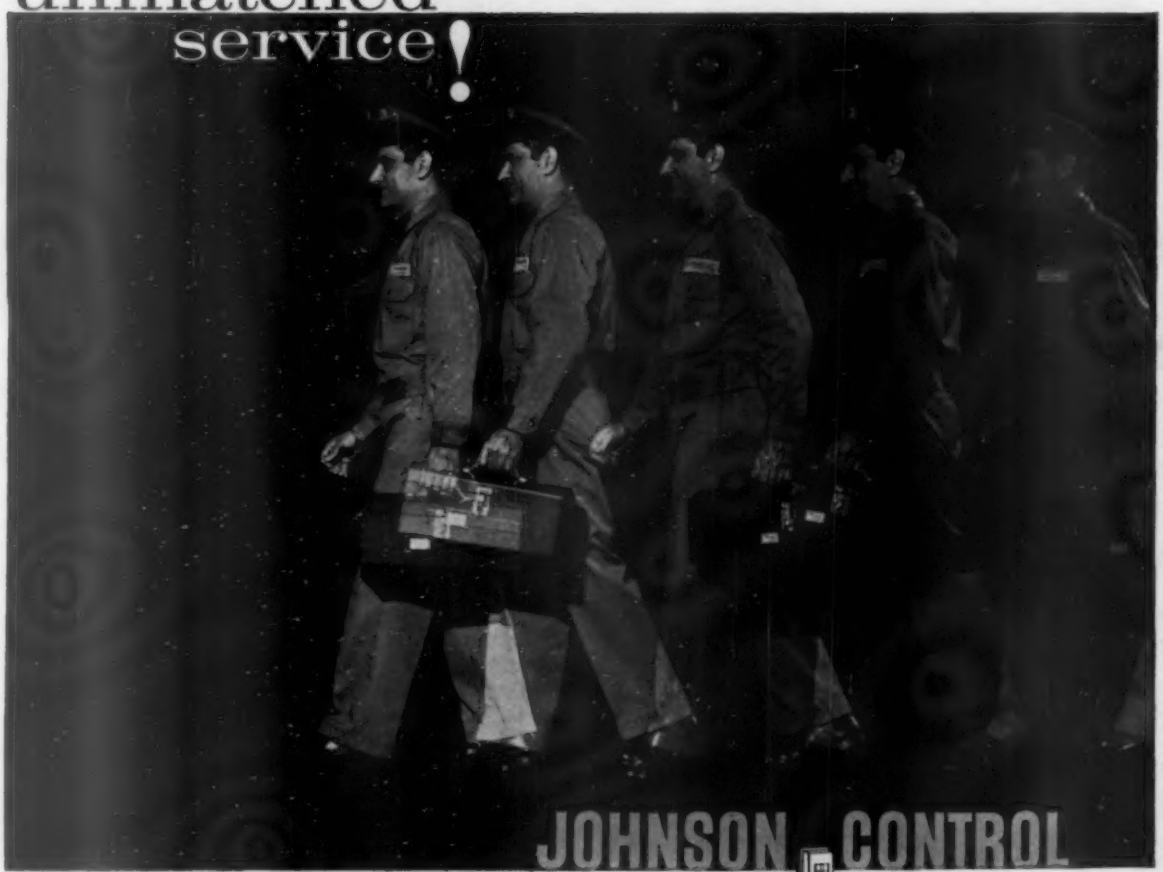

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HUMAN RELATIONS

By V. E. LUNARDI, Assistant Editor, FACTORY

Beating Bushes for Absentees

Playing truant from work is becoming more difficult each day. Not that companies are ringing doorbells to find out if employees are really sick. But they're taking other measures—some positive, others negative—to combat absenteeism, according to *Industrial Relations News*, New York City.

As a reward for a year's perfect attendance, one company presents an extra week's wages, another a week's vacation. Still the positive inducement, bonuses based on earnings to employees with perfect attendance records are granted by one company. In the category of "psychic income" is a personal letter of congratulations sent to deserving employees by the president of a big steel company.

On the negative side, bigger and better mousetraps are snagging chronic absentees. A Canadian paper company collects demerits against the absentee, finally fires him. Others send a supervisor or plant nurse to the home. At a large aluminum company, loss of seniority is the penalty for over a month's absence in one year. And here's a final rap across the knuckles that's felt right down to the pocket—no pay increases at a division of Avco Corporation (Coldwater, Ohio).

Lowdown on Electronics-ese

The world of electronics spins ever closer to the plant operating manager. And if he wants to keep up with this atomic age, understanding the "way out" language of the space man is required for the course. To simplify terms for managers and the rest of us outsiders, two Raytheon Company (New York) engineers dropped in from the outer reaches of the Institute of Radio Engineers show with these down-to-earth phrases:

- Damped oscillation—End of a rock 'n roll party.
- Condenser—Design of midget radios.
- Semiconductor—Railway official who is five foot two or under.
- Hysteresis—One of those new viruses.
- Grid bias—College football game reported by an old grad.
- Megacycle—Small Italian motor scooter.
- Memory tube—A wedding ring.
- Inertial guidance—Permissive parenthood, or leaving well enough alone.
- Countermeasures—Dr. Spock's system, the opposite of inertial guidance.
- Isolation network—The office grapevine.
- Pentode—Sap-sucking pest that frequents African violets.
- Thermistor—A hot engineer.
- Telemetering—Why women need unlimited telephone service.
- Triode—What the "beat poet" writes.

Pomp Pampers Pride in Payment

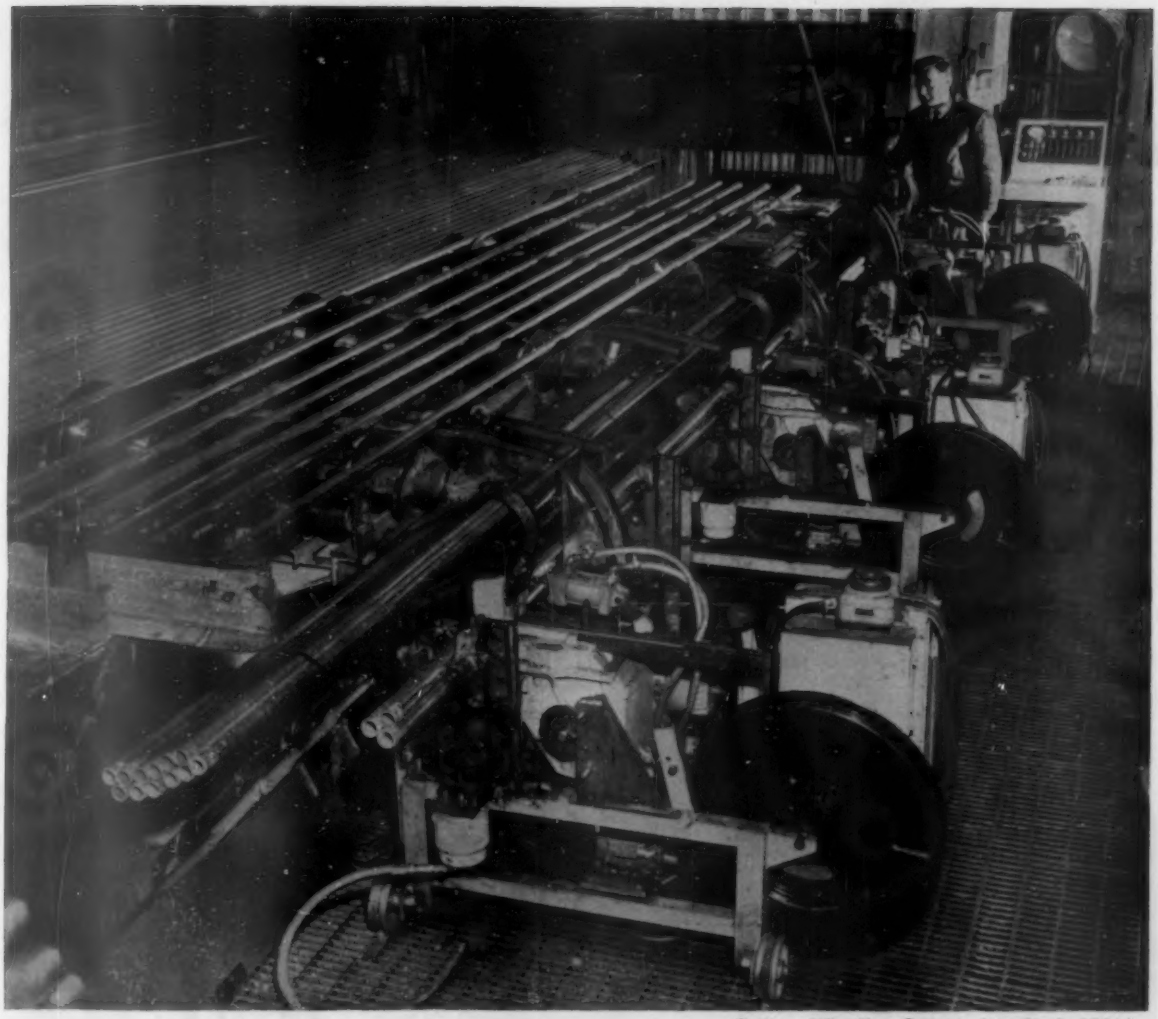
Incentive awards to first-line supervisors should be presented annually in an atmosphere of pomp and ceremony. This was the advice Richard C. Smyth, New York management consultant, gave a University of Michigan industrial relations conference group.

These awards are best paid annually, and should add from 20 to 30% to the supervisor's base pay, he continued. And a top management man should personally present separate checks to each man.

Don't make the mistake of slipping these payments in with the supervisor's monthly salary, cautions Smyth. Too often, bonuses thus paid are regarded as part of the salary after a time. Spread your incentive program around to all departments, not just to production, he concluded.

In a nutshell: It's the frosting on the cake that makes a lasting impression and spurs men to sustained high levels of job performance.

Turn the page



Courtesy of Blaw-Knox Company, Aetna-Standard Division

New Signode machines bundle pipe in seconds

Three synchronized Signode Model MS2BR power strapping machines are at work here. They automatically apply three straps per bundle. With these machines, it is now possible to keep ahead of the production of high speed pipe mills. Uniformly tight bundles are produced.

Similar Signode power strapping machines for pipe bundling have been proved dependable in more than six years of pipe mill service. They are ideal for strapping electrical metallic tubing and rigid conduit, as well as pipe. Write for more information about these machines or this installation. Signode counsel is available to help you work out a strapping installation that meets your requirements, no matter what your product. No obligation. Just write:

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Refinery drum is opened

Loader pump seals the drum against dirt or grit

Loader pump nozzle engages fitting on gun. Just eight strokes fill a 1-lb. gun with fresh, clean lubricant.

Begins on page 198

April Fool Holiday, No Kidding

"Didja hear that we're off tomorrow?" This query from an S. C. Johnson & Sons (Racine, Wis.) employee to his fellow-worker referred to Apr. 1. No April Fool's prank, this was the first "Johnson's Wax Spring Holiday," an extra paid day off. Each year, management plans to grant a Monday or Friday holiday to 1500 employees as a tribute to their "performance and productivity."

In the fall, the Friday after Thanksgiving also is scheduled as a special holiday. With these two additional days off, Johnson employees get a total of eight paid holidays yearly.

All That Glitter "Dates" Ladies

Diamonds aren't always a girl's best friend, managers in charge of service awards may be surprised to learn. At least, not when their glitter brands the wearer as an "old timer." That's why companies should think twice before pinning fancy buttons on veteran female employees.

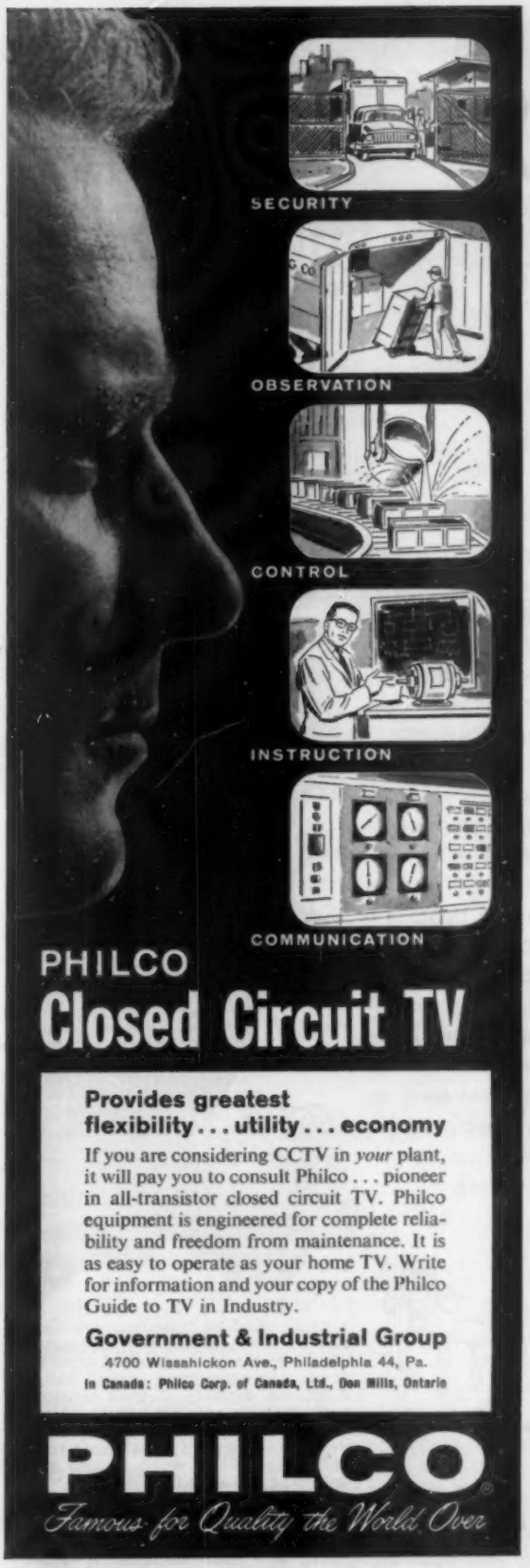
A New York management consultant had this to say recently in *Industrial Relations News* (New York City): "The more gold and diamonds a worker sports, the farther over the hill he is."

So when a reward for long service is in order for the ladies, how about making it a bouquet of roses? Or, as one big bank does, offer them a choice of sterling silver gifts. And here's a natural for the "weaker" sex: At Freeport Sulphur Company (New York), when they refer to ships as "she" they aren't fooling. Company ships are christened with names of employees with 30 or more years' service.

Visual Aids Ease Moving Pains

Management at Atomics International (a division of North American Aviation) really got off the ground in moving 200 employees to new quarters. It took an aerial photo of the new facilities at Canoga Park, Calif., to show its people the best roads to take to and from work.

Other visual aids given employees included a zon-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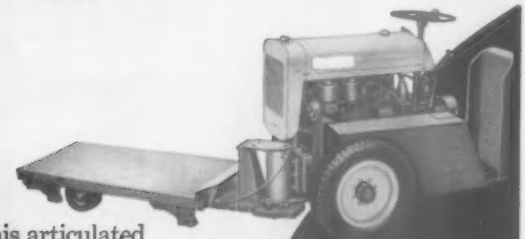


This articulated pivot (illustrated above) reduces turning radius to a minimum and gives the advantages of four-wheel steering. It entirely eliminates weaknesses and rapid wear common to complicated conventional steering mechanisms. It is similar to the system used on large, well-known earth movers.

Above is a typical Erickson Low-Lift Platform Truck. Standard models up to 10,000 lbs. capacity. Custom models up to 20,000 lbs. capacity. Platforms custom built up to 6 ft. wide, up to 24 ft. long.

Erickson Hi-Lift Platform Trucks have various platform sizes and lifts available. Stand-up cockpit (as shown) or operator's seat. Standard automotive controls are a feature of all Erickson Platform Lift Trucks.

ERICKSON
the Workhorse of Lift Trucks

Erickson Kart-All materiel-personnel carriers are available with scissors-lift platforms. Airline model shown above has standard baggage bed, 4,000 lbs. capacity. Custom models built with beds up to 8 ft. wide by 24 ft. long, up to 12,000 lbs. capacity. Hydraulic outriggers obtainable for stabilizing Kart-All when loading or unloading heavy loads.

ERICKSON POWER LIFT TRUCKS, INC.

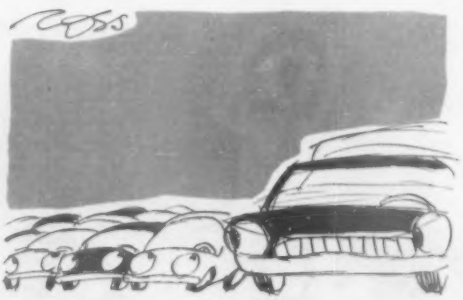
273 St. Anthony Blvd. N. E., Minneapolis 18, Minn.

202 For more facts Circle 495 on Reader Service Card

Begins on page 198

ing map and master plan of the new plant and the surrounding area. All these reached personnel in a neat package—an easily removed insert page of the company's house organ. Other details of the move also appeared in the paper. When moving day arrived, no one was "flying blind." All knew the paved, unpaved, and private roads leading to the plant.

On arrival, they parked in parking areas assigned to employees and supervisors as indicated on the master plan. Result: Nobody made a wrong move, and there was little or no confusion.



Room for a Few More

Do the employees at your plant suffer from an occupational disease known as jagged parking nerves? At Sperry Gyroscope Corporation, Great Neck, N. Y., this problem has been virtually wiped out by the conversion of some large parking stalls to small ones and reallocation of space.

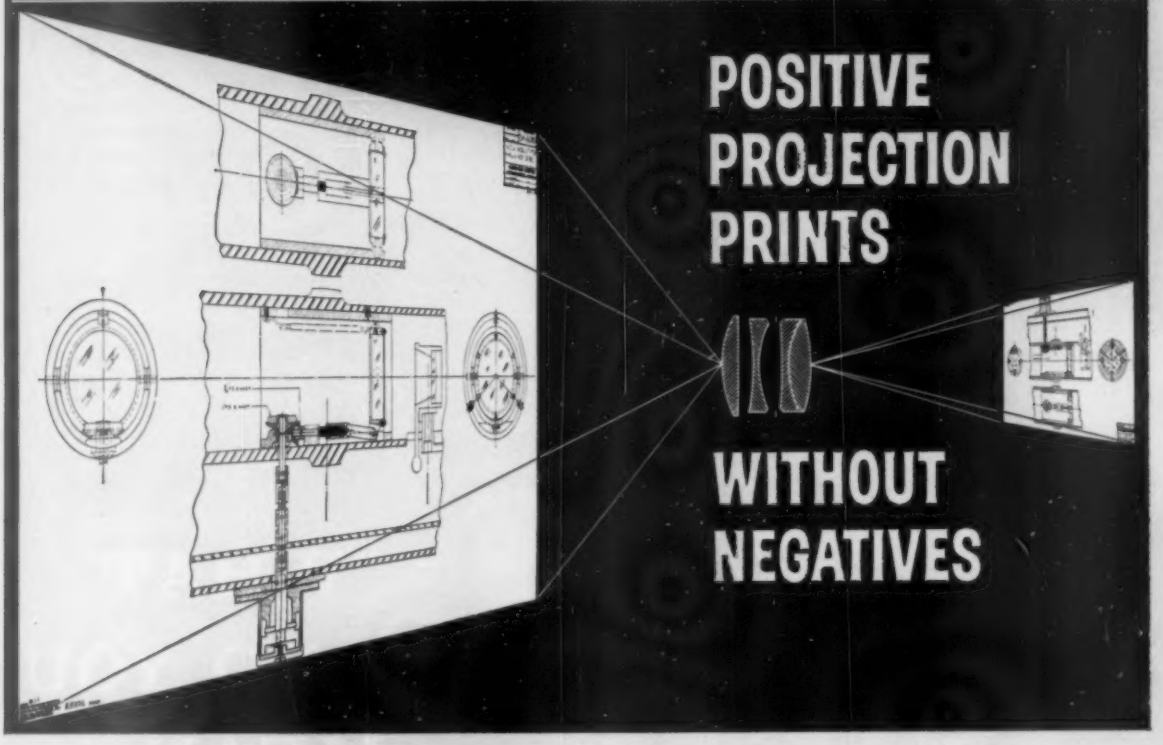
But uplifted worker morale is not the company's only reward for its efforts. By separating the small (mostly foreign-made) cars and parking them in 7x14-ft. stalls, Sperry has increased its available parking space by nearly 25%. Larger cars still use the regular 8½x18-ft. stalls.

Tranquil But Troublesome

You can be too relaxed on the production line, say plant men who know. Time-study men, foremen, superintendents, and safety engineers find that workers under the influence of tranquilizers are not always efficient. Their advice to foremen: "If you've got a man who is taking tranquilizers, take him off the production floor. He's a hazard."

For those dependent on tranquilizers, a new class of drugs may help. One shown at the recent annual assembly of the American Academy of General Practice in Philadelphia returns the worker to the production line with no manual or intellectual impairment. This drug is said to remove muscular pain and to help in overcoming psychogenic disorders such as over-anxiety and alcoholism.

NEW FROM KODAK **Kodagraph Autopositive Projection Paper**



Here's an entirely new direct-positive camera-speed paper with special quick-processing, wash-off emulsion . . . no fixing required.

Now, with a *single* shot in camera or enlarger, you can make—on paper—high-contrast *positive* reductions or enlargements of positive originals . . . or you can make negatives from negatives. Develop in Kodagraph Autopositive Projection Developer (no fixing required), then rinse off emulsion and wash. *Specially suited* for making reduced-size intermediates of engineering drawings, or enlarged positive prints from microfilm positives. Also ideal for copying any document or art pasteup.

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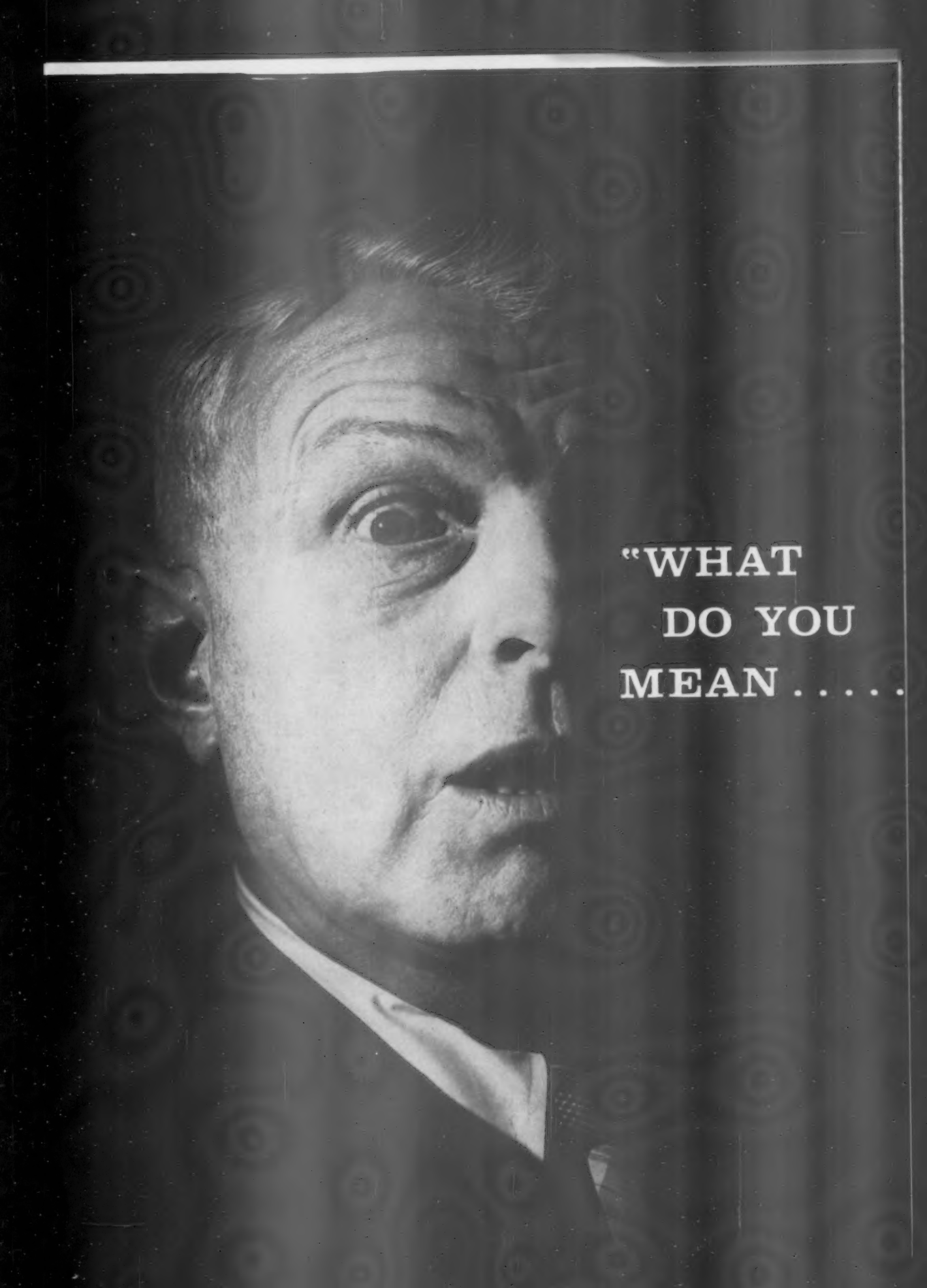
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By PAUL A. KING, Member, New York Bar

Two Rulings Clarify Subcontracting Picture

This pair of awards should clear away some of your doubts and misconceptions about the increasingly perplexing business of subcontracting.

There was nothing wishy-washy about Arbitrator Peter Kelliher's award to this effect: In the absence of specific language in the contract forbidding subcontracting, a good-faith transfer of work to an independent contractor will stand up before arbitrators and the courts.

In his award rendered in the Minneapolis-Moline Company dispute, Kelliher reviews the authorities in the field and sets down principles and citations of other arbitrators. His findings are worth studying before you negotiate a first contract or even later on when you are struggling to get the union to go along with subcontracting work.

In the case that provoked his dissertation, the company retained an outside contractor to handle the duties formerly performed by employees in the watchman class.

Said Kelliher: "The great weight of arbitration and court decisions . . . is clearly to the effect that the recognition clause, the seniority clause, and other general provisions of a collective bargaining agreement do not in themselves constitute—either expressly or impliedly—a limitation upon management's right to subcontract work."

Quoting Fellow-Arbitrator Feinberg in another case, he states: "It has almost been universally recognized that in the absence of such a provision (a limiting one) an employer may, under his customary right to conduct his business efficiently, let work to outside contractors, if such letting is done in good faith and without deliberate intention to injure his employees."

Kelliher then quoted from a court ruling: "Under the common law, neither the union nor its members had any rights as to management or duration of employment and hence had no right to complain if the company discharged any employees and subcontracted work previously done by them. It therefore follows that if this right of management has been surrendered it must be found in the contract.

"The mere signing of a collective bargaining agreement does not deprive the company of its normal rights of management, and no intention to yield or impair such inherent managerial function—including the right to subcontract—can be implied by such signing. Management may, if it chooses, restrict its freedom of action in this field. But its intention to yield its inherent prerogatives must be found in the agreement."

However, cautions Kelliher: "The long line of subcontracting cases is to be distinguished from other cases where the work is assigned to non-bargaining unit employees rather than the employees of a *bona fide* independent contractor." He further reminded the parties to his award that he "has uniformly upheld the union's position and has found a violation where management assigned work to non-bargaining unit employees."

On still another front, the issue has been researched in detail and the results offer a single source reference that management has been looking for. Lawyers for the Celanese Corporation and Arbitrator G. Allan Dash, Jr., combined their talents to present the last word on the law of subcontracting.

To its fame for making fibers and chemicals, Celanese has added an arbitration award on subcontracting. It took the help of Arbitrator Dash, who went beyond the cases and awards presented by the parties to the hearing and added some research on his own. All of this adds up to a voluminous arbitration award which ought to be the first step in labor relations research on subcontracting.

Dash read in part or whole 70 arbitration awards on this subject and summarized their conclusions in two tables. He also summarized the leading court decisions on the subject and showed where they were at odds with arbitrator opinion.

The issue in the Celanese case was whether or not the issue of subcontracting was arbitrable. And it was, said Dash—but the award will be remembered not only for its conclusion but its exhaustive study of the decisions and awards.

Hard Rules

There are plenty of reasons why you can't fire workers for failing to meet minimum production standards.

In a 4000-word opinion, Arbitration Chairman Douglas B. Maags reinstated three women workers fired for this reason.

The women were sewers in a bag manufacturing company. Their pay was based on the number of bags sewed per eight-hour day. All were discharged for failing to meet minimum production standards.

Plant men will be hit close to home by these principles set forth by Maags:

(1) Briefs submitted to the arbitrator after a hearing must be confined to the evidence presented at the hearing. It is proper for an arbitrator to refuse to consider evidence first presented in a brief. A brief should be limited to argument. This rule is applicable to all arbitrations.

(2) The following are special to production cases: When employees are discharged for failure to meet production standards, the union should be furnished with information (if it requests it) as to the production of the discharged employees and their fellow workers. (In the case before Arbitrator Maags, the union had asked for the number of bags

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Applies cleanser, scrubs, flushes, and picks up—in ONE operation!

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For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2506 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

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UNIT-COLES Mobile Cranes have a heavy duty, self-propelled chassis and are available in capacities ranging from 5 to 55 tons. Write today for details on the complete line and the name of your nearest dealer.

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UNIT CRANE & SHOVEL CORP.
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Milwaukee 19, Wisconsin

For more facts Circle 499 on Reader Service Card

FACTORY

the sewers had completed per eight-hour day and the average per week over the several weeks' period during which the three discharged sewers had been fired. The company had turned down the request—right up to the arbitration hearing. It was finally persuaded by the arbitrator to furnish the data to the union—and to the arbitrator.)

(3) To use the plant average as a minimum standard of production is unreasonable because it is an ever-rising standard.

(4) To fix a standard of minimum production that will result in discharge if not met is a proper subject for collective bargaining. In the absence of agreement about such a standard, the company is entitled to establish one unilaterally. But its reasonableness is subject to the grievance procedure and to arbitration, at least when a discharge is based upon it.

(5) A company's action in discharging an employee for low production without having announced a standard is also subject to the grievance procedure and arbitration.

(6) In discharging employees for low production, with or without an announced standard, the company acts without just cause if it treats employees differently without sufficient reason. Discharges of one or more employees for low production while other employees are retained, although their production is low or not significantly higher, should be scrutinized closely. There is the obvious possibility that the employer has indulged in unjustified favoritism in such cases.

Good rules to keep in mind, don't you think?

Labor Relations Guide

For a quick brush-up on labor relations law try this new Guidebook.

In 1935, the National Labor Relations Act became law. In 1947, it was amended by the Labor Management Relations Act (Taft-Hartley). Last year the law was again amended —by the Labor-Management Reporting and Disclosure Act. And since 1935, there have been thousands of NLRB and court decisions

New Replasa-Panal Solves Old Glazing Problems

One of your own men can now quickly replace your broken glass with shatterproof fiberglass reinforced plastic panels that have the best light transmission quality money can buy. Replasa-Panels are specially formed to be easy to store and carry, install quickly, and make a secure, weather-tight job, yet they cost no more than ordinary wire glass. No cutting, fitting, or face puttying!

This is your finest assurance against broken glass and leaky skylights and windows, for either top-hinged or fixed sash, when muntin bars are still usable as a frame. For complete information and prices, mail in the coupon below.

OR, IF ENTIRE SECTIONS OF SASH NEED REPLACING, use Aluma-Sash

We have installed hundreds of thousands of feet of this complete sash replacement system, consisting of top quality translucent plastic and a continuous aluminum hinged frame designed for years of rugged service, at the lowest possible contract price. Write for details.

Stylux BY BUTLER

Our superior fiberglass reinforced plastic panels are made from Butler Stylux, the acrylic-fortified panel that has been job-proved for outstanding durability, weather endurance, and light transmission. We carry the entire Stylux line, and can ship direct to you. Mail this coupon today!

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40 years experience in solving industrial glazing problems.

Please send price information and detail drawings. We are interested in: (check one or both)

☐ Replacement of individual glazing units by plant's own crew (Replasa-Panal)

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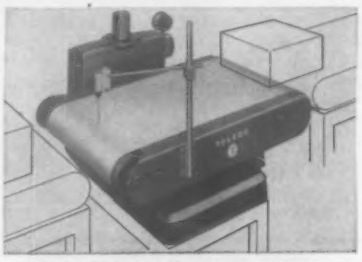
TOLEDO Reports on Automatic Weighing

★ NEW IDEAS FOR COST-SAVING

Chance of human error is eliminated in this Toledo system. Each formula is preset on a "Batchboard". The control panel can be located as desired in relation to the scales.

AUTOMATIC BATCHING

Operator at convenient remote location has full command of a multiple scale batching system with Toledo Remocon. As many formulas as required are pre-set on "Batchboards" and inserted into panel. This is one of several types of Toledo remote-control batching systems for today's needs, including punch card, "Formulaplug" and digital scanner. Ask for Bulletin 2964.



CHECKWEIGHS IN-MOTION

Many plants today are putting Toledo Automatic Checkweighers into their conveyor lines. Models to provide continuous, 100% in-line checkweighing of items from a few ounces to 200 pounds. Motorized belt. Handle sacks, cartons, packages, pieces, parts. Ask for Bulletin 2968.

LOAD CELL DIAL DOES TRIPLE DUTY

. . . ALSO PRINTWEIGH RECORDING

One remote dial serves *three* platforms in this Toledo Electronic Load Cell Scale for truck weighing at a large cement plant. With a truck on three platforms, scale reads individual axle loads or total weight. Equipped with Printweigh "400" to print full figure weight data. Brings new versatility to weighing. Request Bulletin 2970.

AUTOMATES DRUM-FILLING

In this oil industry plant, a Toledo sub-surface filler automatically eliminates foaming and controls drum filling. The scale is keyed into conveyorized system . . . provides faster, more accurate filling. Saves time, labor, avoids loss of material and customer goodwill. One of many operations where Toledo controls guard costs. Ask for Bulletin 9030.

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WRITE TODAY for specialized help from our Custom Products Division, or contact the Toledo Office near you, to solve your problems in batching, checkweighing, drum-filling, load cell applications. TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio.

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interpreting the law. The result? Conflicting points of law; points that are hard to remember and to relate with each other.

There has just been published a one-volume library on labor relations (336 pages) covering the National Labor Relations Act and its amendments and other labor laws going back to 1926. It's ideal for a quick brush-up before a discussion with the union or the plant executive. Title: *1960 Guidebook to Labor Relations.* It's published by Commerce Clearing House, 4025 W. Peterson Ave., Chicago. Price: $5.

Profit-Sharing Rights

No share of profits for this discharged employee—even though he was discharged after the year closed.

Deferred profit-sharing plans are supposed to reduce turnover, encourage the employee to stay on until pay-out, retirement, or disability. Only a small part of the employee's interest is vested each year.

Current profit-sharing plans are supposed to be different. The employee's full interest is generally payable to him after the close of the year—when the figures are in. It's considered extra pay and an incentive for the employee to work harder during the year. You'd think that once the year was closed—and the employee had worked all through that year—nothing could stop the pay-out. This, as a rule, is the story. But there was an exception in one case where the company had inserted some trick language in the contract.

The company had notified employees about its profit-sharing arrangement—in writing. The period was the company's fiscal year. After the end of each quarter, participating employees would be given one-half of the estimated profits for that quarter—according to a formula. When the year was closed out and the actual profits toted up, the balance would be paid out.

One employee was fired after the year was closed and was not given his share. Of course, he beefed. He did more than that. He took the company to court—and lost.

Why did he lose? Because the

NEW: "Big" drilling jobs made easy

Delta 20" Drill Press, also 17", 15", 14" and 14" Super-Hi Sensitive. Available in floor, bench and multiple spindle models.

This custom "radial drill" is provided by combining standard Delta drill press components—an 8-ball bearing traveling carriage, husky 33" column, raising mechanism and choice of four Delta 20" drill heads. Suspended from an overhead trackway, it swings to any position over the work—handles jobs too big for conventional drilling, in production runs too small to justify an expensive machine tool.

But whether your production requirements call for special set-ups or standard tooling, you'll find that Delta drill presses offer you money-saving versatility and precision performance under the most rugged work loads. Delta drill presses have set the industry standard for years because they cost less to buy, operate and maintain.

Choose from the world's most complete drill press line—visit your Delta Industrial Distributor (listed under "TOOLS" or "MACHINERY" in the Yellow Pages). For FREE Delta Industrial Catalog showing 61 machines, 302 models, over 1400 accessories, write: Rockwell Manufacturing Company, Delta Power Tool Division, 628F N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

DELTA INDUSTRIAL TOOLS

another fine product by

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Specify the

T-J Spacemaker

for longer, more efficient cylinder service

You too—can reduce replacement expenditures—lower maintenance costs with the T-J Spacemaker cylinder line. Designed and engineered for ruggedness, and accuracy of operation, the Spacemaker assures longer, uninterrupted operation.

The T-J Spacemaker eliminates tie-rods, gives greater strength, saves space . . . and reduces costs in all push-pull operations. Immediate delivery in a complete range of styles and capacities . . . air or oil. Write for Bulletin SM 155-4, today. The Tomkins-Johnson Company, Jackson, Michigan.

WITH EXTRAS . . . AT NO EXTRA COST

1. METAL PISTON ROD SCRAPER—protects rod packing, cylinder bore and rod surface by removing all foreign particles.
2. NEW "SUPER" CUSHION for air or METALLIC SELF-ALIGNING MASTER CUSHION for oil.
3. HARD CHROME PLATED CYLINDER BORES AND PISTON RODS for greater protection and reduced wear.
4. ONE PIECE PISTON assures better alignment, longer bearing and packing life.
5. FORGED SOLID STEEL HEADS throughout entire line.
6. PILOTED PACKING GLAND with extra long bearing for additional strength and support to piston rod.
7. NO TIE-RODS TO STRETCH—gives you 360° port rotation . . . less space used . . . full strength.
8. STREAMLINED DESIGN . . . operating pressures to 200 PSI, air; 1,000 PSI oil, non-shock.

T-J TOMKINS-JOHNSON

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Begins on page 206

plan contained these clauses: (1) Any eligible employee who resigned voluntarily or was dismissed would not be eligible to receive the balance of his share which otherwise would have been due him on or about Nov. 1 (when the fiscal year ended). (2) Notwithstanding anything to the contrary, any right or claim to any interest in the profit-sharing fund which any employee may have shall terminate when he is no longer an employee of the company.

A softer-hearted trial court gave its verdict to the employee but was overruled on appeal by the New Hampshire Supreme Court. It ruled: "It is difficult for plaintiff to extricate himself from the conditions of employment which he has voluntarily assumed, for even though the forfeiture provisions seem harsh, we can only interpret the contract which the parties have made."

Test Whiz Loses Out

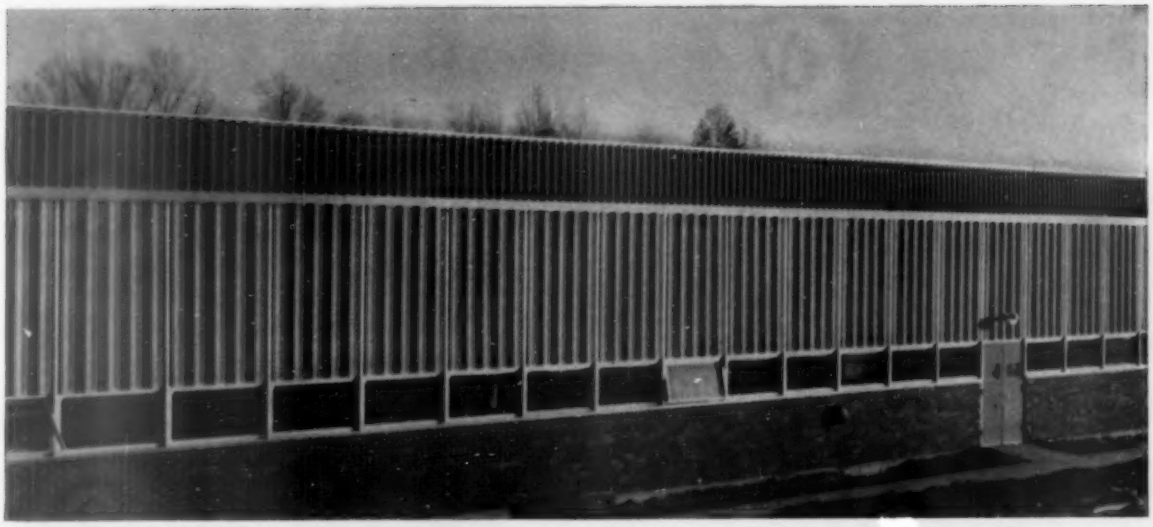
Test results can be passed over in determining ability under a promotion clause, ruled this arbitrator.

In an arbitration involving union employees of the Wisconsin Electric Power Company, an impartial panelist arbitrator, Peter M. Kelliher, endorsed the idea of company tests to determine the promotion qualifications of employees. He indicated that most other arbitrators would agree with him.

In another case, handled by Arbitrator Langston T. Hawley as panel chairman and involving a plant of the International Paper Company, the question was not whether tests can be given. It was whether test results can be passed over by the company when promotion is supposed to be based on the relative ability of employees. The contract clause read: "When it is necessary to fill the bottom job in a line of progression other than by hiring from the outside, management will take into consideration seniority and ability; and when all the factors which constitute ability are relatively equal, then seniority will determine the promotion." The job was millwright helper.

Turn to page 217

For more facts Circle 503 on Reader Service Card



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Wall panels are tan Shadowall® with aluminum channel mullions projected from window jambs.

Band of gray Shadowall® is a monitor, set back about 25 feet.

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General Contractor: Wallace Engineering & Construction Co., Philadelphia.

EGSCO metal wall panels provide the building designer with maximum selection. Their versatility and adaptability to all types of construction are virtually without limit. Their variety of color and configuration lead to design innovations where used alone, but also are compatible and easily adapted to other wall components of masonry, metal or glass.

EGSCO panels are made of aluminum or steel in contemporary structural colors, of baked-on epoxy enamels scientifically bonded to the metal. Together with their ample insulation, concealed fasteners and structural strength, EGSCO wall panels assure sound construction of enduring appearance.

Modest in material price to begin with, EGSCO panels are designed for a specially developed erection technique that reduces erection man-hours substantially below the norm, further contributing to overall construction economy.

EGSCO erection crews have the experience and know-how to erect any of these metal wall combinations quickly, soundly and at a realistic cost.

For complete specifications on EGSCO products, see Sweet's Files: 3a/Sm, 8b/Sm, 8b/Smi, 2a/Sm, 2c/Sm, or write direct to:

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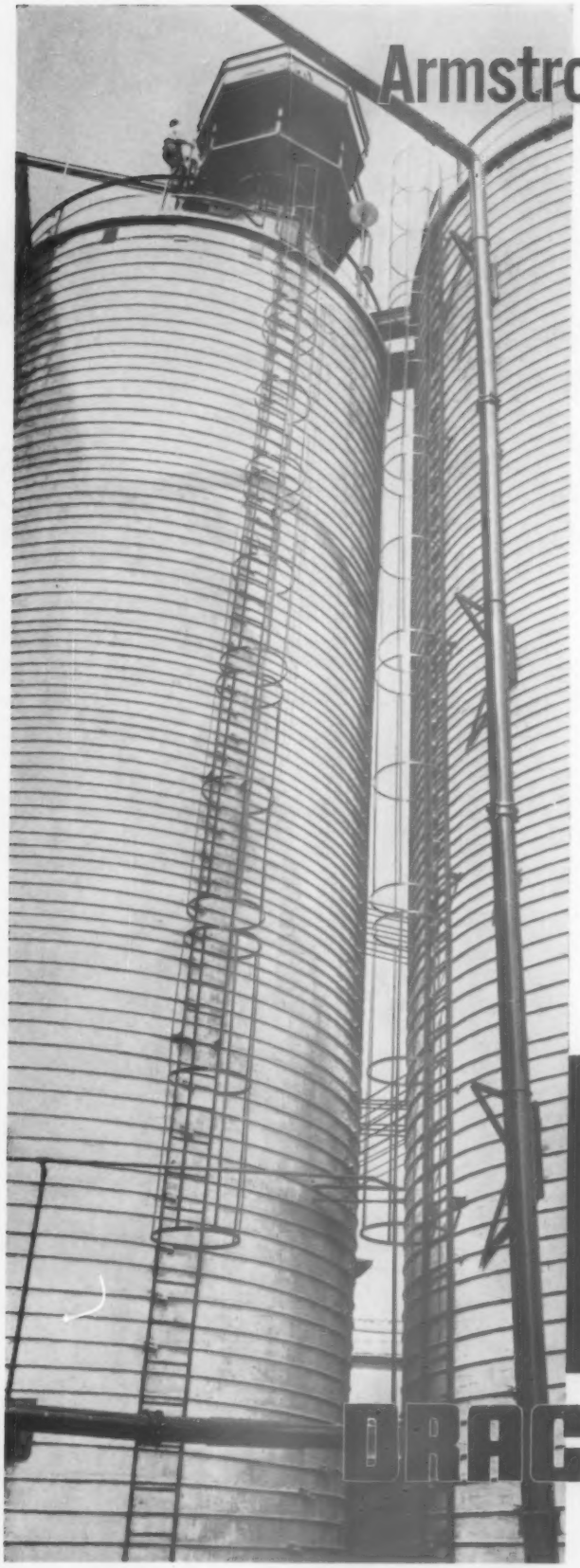

Armstrong Cork Co. goes *"up in the air"* to keep handling costs down

Automatic bulk handling with a Dracco Airstream Conveyor System provides a major assist in maintaining top quality, automated production at one of Armstrong's resilient flooring plants.

This plant is the world's most modern facility for manufacture of asphalt and vinyl-asbestos flooring tile. Airstream Conveying was chosen to furnish low-cost bulk handling in conjunction with other advanced processing techniques. The system unloads filler from boxcars, stores it, then moves it to process with only part time supervision of one man.

This is just one example of how economical air conveying helps industry gain more profits from automation. For full information on how Dracco can upgrade your materials handling, write: Dracco Division of Fuller Company, Harvard Avenue and East 116th Street, Cleveland 5, Ohio.

(left) Efficiency is raised here — Airstream Conveyor unloads material from boxcars to storage. Integrated system also moves material to process and permits use of gravity-flow techniques.
(right) Bulk handling by remote control is advanced feature of ultra-modern plant. Airstream Conveyors adapt readily to automated processes.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY

Photographs by the Armstrong Cork Co.

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HIGH-STYLE DISTINCTION IS YOURS WITH STRAN-SATIN COLORS

Stran-Style horizon-hugging profile buildings are an asset to any community. From lawn level to low-sloping roof, they are smartly functional, give optimum space for efficient operation.

Nine bright new Stran-Satin colors are baked on at the factory. The Stran-Satin process is a multi-layer, protective coating of vinyl-aluminum or vinyl-base color over zinc-coated steel. Stran-Satin colors will not peel or fade . . . assure protection and beauty without maintenance for years to come. All blend well with wood, brick, glass or stone. Financing available for complete buildings from ground up. For detailed information, fill in and mail coupon below.

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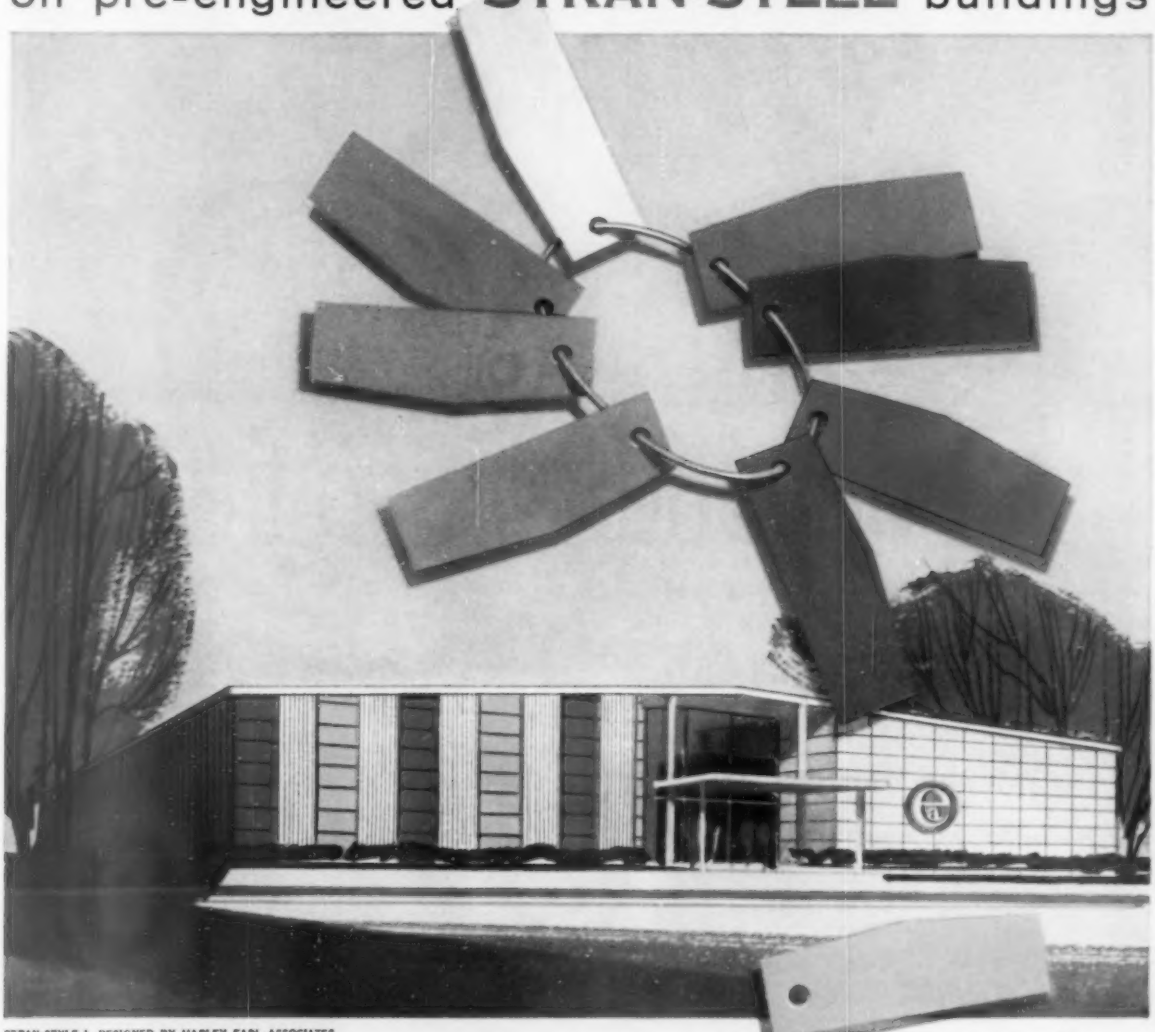

STRAN-STYLE I, DESIGNED BY HARLEY EARL ASSOCIATES

Clip coupon and mail to STRAN-STEEL CORPORATION, DEPT. FMM-13, DETROIT 29, MICHIGAN

Please send complete literature on Stran-Style Buildings in Stran-Satin Color. I'm interested in a building approximately_____ ft. by_____ ft. to be used for_____

Name_____ Title_____

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Stran-Steel

STRAN-STEEL IS A DIVISION OF **NATIONAL STEEL CORPORATION**

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Where so much depends on so little...

. . . call on your ROLLWAY Distributor for the bearing you want *when you want it!*

● *There are more than 400 Rollway Distributors, located to serve you at a moment's notice. Ask your nearest one for a complete product line bulletin or write the company direct. Rollway Bearing Company, Inc., Syracuse, N. Y.*

When down-time costs pile up as a result of bearing failure, bearings become the most important component on the line.

To avoid an excess of such costs, call on your Rollway distributor. He'll get your bearing to you in the minimum possible time . . . calling on the greatest range of sizes and types of straight cylindrical roller bearings available anywhere today . . . Rollway Bearings.

Furthermore, at your request he will furnish competent engineering help on replacement installations.

Solidly behind him stands the long experience and latest know-how of design, manufacture and application that places Rollway Bearings in the most respected machines of today.

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This arbitrator agreed with Kelliher about the use of tests. Said he: "In making such comparisons the company is entitled to use tests so long as they are reasonable and valid for the job at hand." But, in the past, this company had failed to promote senior employees who passed the tests. Sometimes it would give the job to a junior man who, in the company's opinion, had greater ability.

In the case that confronted Chief Arbitrator Hawley, the issue was: Can this be done? Can test results be ignored? Hawley ruled that test results could be ignored—at least in the case before him. He ruled in favor of the junior employee. Pointed out that the aggrieved senior employee, in the past, had requested a demotion, refused a promotion, and been officially reprimanded for poor quantity and quality of work. He was adjudged by his supervisor to be a borderline worker.

But one odd thing about this case was that by the time it went before the arbitrator, the senior employee —who was passed over and about whom the fuss was being made— was promoted to millwright helper, the job involved in the arbitration. The union argued that this was proof positive that the employee's work was satisfactory and that he should have been promoted initially. Irrelevant, said Hawley. That he would turn out to be satisfactory was not known to the company at the time it decided to pass over him.

Union Literature

Here's a neat summary of the law governing distribution of pro-union literature on company property and solicitation of union membership.

In a recent case, the NLRB interpreted two U. S. Supreme Court decisions on this subject. It said:

(1) *Solicitation or distribution by employees on non-working time:*

"No-solicitation or no-distribution rules which prohibit union solicitation or distribution of union literature on company property by employees during their non-working time are presumptively an unreasonable impediment to self-organization and are therefore presumptively in-

Save up to ⅓ on the cost of your next conveyor...new handbook shows how

Tells how to cut planning and installation costs with pre-engineered, ready-built conveyor components for immediate or future handling needs

Install a conveyor system to meet your specific materials handling needs today . . . tomorrow . . . or in years to come. Using Standard's Handidrive handbook, simply order pre-engineered, prebuilt interchangeable conveyor components to which additions or alterations can be made as required.

"Do-it-yourself" buyer-users will find Handidrive assembly is fast, easy. The pre-engineered stock units include: roller conveyors (either gravity push-along or live roller type), inclined belt conveyors, drive units, intermediate sections, curved sections, supports, hangers and other miscellaneous items.

Lower initial cost — you buy only what you need — is only one of many Handidrive "off-the-shelf" benefits. The Handidrive handbook gives full details! Get your copy now . . . free of charge, of course.

3 plans to help you select and order simplified HANDIDRIVE pre-engineered units

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E. G. Wolf, Jr.,
Supervisor Plant Engineering,
Hussmann Refrigerator Co., St. Louis, *tells*

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APPROVED EQUIPMENT "...once again Century scored with us. Not only does their exclusive fuel metering value carburetor provide easy starting and smooth idling but we found the equipment FACTORY MUTUAL APPROVED."

Watch our ads for name of your nearest Century Distributor and Dealer

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Butane Carburetion Co., P. O. Box 677, El Dorado

CALIFORNIA
Cal-Gas Equipment Company, P. O. Box 5052, Sacramento
Coast Gas Service, P. O. Box 174, Watsonville
L. O. McClure & Sons, 1131 33rd Street, Bakersfield
Gas Tools, Inc., P. O. Box 1506, Fresno
Campora Gas and Appliance, P. O. Box 868, Stockton 6
Petrolane Gas Service, P. O. Drawer 1410, Long Beach
Suburban Gas Service, 2020 N. Towne Avenue, Pomona
Weaver Gas Service, 1687 S. First Street, San Jose
Western Lift Truck, 21031 Western Blvd., Hayward
Western Lift Truck, 348 W. Weber Avenue, Stockton

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Central Auto Electric Company, 12th Avenue & Lincoln St., Denver

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OKLAHOMA
Tom Gorman Company, P. O. Box 5085, Tulsa
Sooner Gas Supplies, 1611 North Portland, Oklahoma City

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Joe Thompson Implement Co., P. O. Box 7, Abernathy
White Tucker Company, 2310 Canada Dry Street, Houston

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Puget Sound Propane, 10990 E. Marginal Way, Seattle

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Metro-Propane Gas, Ltd., 1400 Sargent Avenue, Winnipeg, Manitoba
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Decatur, Illinois

valid both as to their promulgation and enforcement; however, such rules may be validated by evidence that special circumstances make the rule necessary in order to maintain production and discipline."

(2) *Solicitation or distribution by employees on working time:*

"No-solicitation or no-distribution rules which prohibit union solicitation or distribution of union literature by employees during working time are presumptively valid as to their promulgation in the absence of evidence that the rule was adopted for a discriminatory purpose; and are presumptively valid as to their enforcement in the absence of evidence that the rule was unfairly applied."

(3) *Solicitation or distribution by non-union employees:*

"No-solicitation or no-distribution rules which prohibit union solicitation or distribution of union literature by non-employee union organization at any time on the employer's property are presumptively valid in the absence of a showing that the union cannot reasonably reach the employees with its message in any other way, or a showing that the employer's notice discriminates against the union by allowing other solicitation or distribution."

No Bumping-in Here

A laid-off employee who is elected to the union bargaining committee cannot replace another working employee just so he can get back into the plant fast.

This doesn't happen often. But when it does it can create a super-seniority problem as it did here. A laid-off employee was elected to the union bargaining committee. Relying upon the super-seniority clause for union officials, the union demanded the immediate recall of the employee—although it meant that an active worker would have to be laid off. The company was not willing to yield. It was willing, however, to move the laid-off committee member to the top of the recall list. That was sufficient, ruled the arbitrator, as he interpreted the seniority clauses of the contract.

NEW

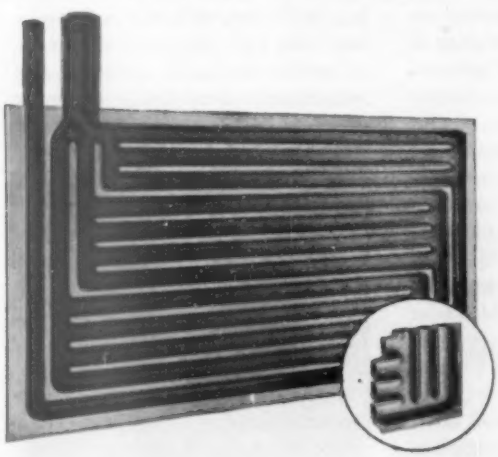
MULTI-ZONE

PLATECOIL®

OPERATING PRESSURES UP TO 250 PSI

Now you can apply the performance and cost advantages of PLATECOIL to tank and process heating with steam pressures up to 250 psi. Higher pressure containment is the result of design and construction refinements such as DURAWELD bonding of plates, new patented MULTI-ZONE pass arrangement and TRANSTEEL mild steel in standard PLATECOIL units. Laboratory tests to destruction have demonstrated a safety factor of 5 to 1.

PLATECOIL SOLVES ALL KINDS OF TANK AND PROCESS HEAT TRANSFER PROBLEMS



PLATECOIL is applicable to a broad range of heating and cooling applications. MULTI-ZONE, header type PLATECOIL, through better distribution of steam, has a reserve of heat transfer capacity for faster "heat-up" and less down time. This reserve capacity also produces extremely fast recovery of desired operating temperatures to keep processing efficiency up. Standard MULTI-ZONE and serpentine (for cooling) units are available in a wide range of sizes.

PLATECOIL units are available in mild steel, stainless steel, Monel, Ni-o-nel, Hastelloy B, Hastelloy C, Nickel and many other metals. All stainless steel and alloy PLATECOIL units affected by cold working are annealed and pickled after fabrication to return the metal to its original condition and thus eliminate the probability of corrosion due to internal stresses and carbide precipitation.

Variations such as double embossed, single embossed (one side flat), banked units and units rolled to specified diameters add to PLATECOIL application possibilities. Surface finishes to meet all types of operating requirements, use of PLATECOIL as structural parts such as tank walls, special connections, hangers and other accessories make PLATECOIL applicable to many special heat transfer problems.

Simplify engineering, installation and maintenance with PLATECOIL — the modern answer to tank heating and cooling problems.

Send for Bulletin P60 for complete information.

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PLATECOIL® DIVISION

MODERN MAINTENANCE

IS PROFITABLE MAINTENANCE

R. L. Kirkpatrick, *Manager, Maintenance Sales,* Westinghouse Electric Corporation

Can You Afford to Do Your Own Electrical Repair Work?

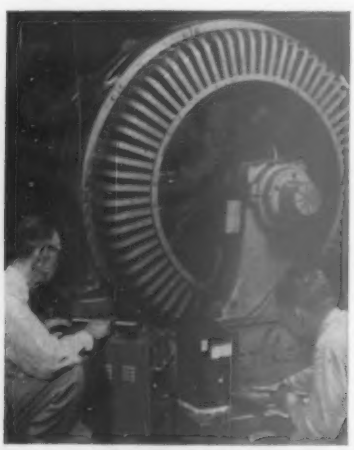
There is a trend for industry to do less and less of its own repair work on production equipment and devote more time to preventive maintenance. There appears to be two major reasons behind this trend: (1) the ever-increasing demand for greater operating reliability of all production equipment, and (2) the high cost of operating in-plant repair facilities.

Maintenance Managers are primarily concerned with increasing the operating reliability of all production equipment to cut down time. The high costs of down time are well known . . . ranging from five dollars to more than one thousand dollars a minute. Maximum reliability can be built into repaired equipment. Modern repair plants are specialists in this field. These plants have the very latest facilities and factory-trained repair technicians. They are thoroughly equipped to handle repairs on all sizes of electrical equipment. Each job is carefully engineered to solve the exact problem that caused the original failure . . . whether electrical, mechanical, or both. Most of these plants guarantee their work. On rewound motors, for example, they provide a one-year guarantee . . . the same as on a new motor. As a matter of fact, when these modern repair plants return your electrical equipment it is often better than when new. They employ the latest

Westinghouse maintenance service

Motor life more than doubled

A pump motor exposed to considerable acid and moisture in a pulp and paper mill had previously required rewinding on an average of three times per year. Westinghouse maintenance service was called on to solve this motor problem. Super COILIFE* epoxy encapsulation was provided as insulation. After nine months, motor is still operating satisfactorily. The same company has since sent two additional motors for rewinding and processing with Super Coilife. *Trade-Mark



Voltage leakage test of large d-c motor in processing plant—one of many tests in the Westinghouse contract plan augmenting the company's preventive maintenance program.

Westinghouse maintenance proves fast, dependable

A 2850-hp induction motor on a river dredge, operating continuously at high overload, recently required fast and highly capable maintenance. The call came to the Westinghouse engineer at 1 A.M. The motor had lost three coils. Despite dense fog, regional cold and confusing levee roads (according to the report), the coils were removed and the motor was back in service the same morning. Arrangements were made to order mechanical parts and Thermalastic®-insulated coils for a complete overhaul, performed by Westinghouse at a later date. The motor now is better than when the customer originally purchased it in 1926.

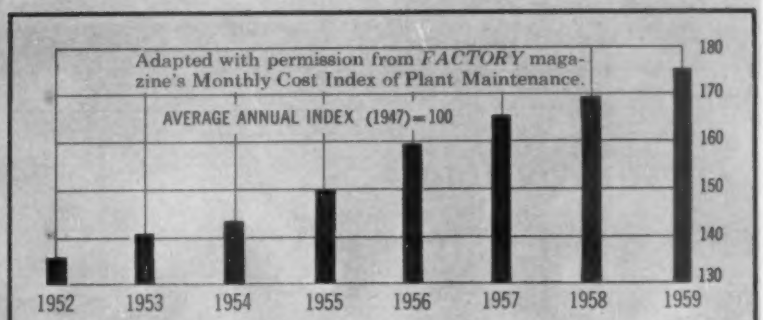
Costly down time eliminated with scheduled inspection

"In-service" failures of large motors operating processing equipment of a large Midwestern company were a serious production problem to Maintenance Management. Westinghouse recommended an annual inspection and testing program to prevent such breakdowns. Field Service Engineers have conducted thorough

developments in materials and techniques. Up-to-the-minute instruments are used to thoroughly test all repaired equipment before it is returned to you. In short, a modern repair plant does everything possible to build maximum operating reliability into your production equipment.

The expert services of a modern repair plant are also available around-the-clock, seven days a week. These specialists are ready to provide service in your plant as well as in their own on a planned or emergency basis. You pay for these services only when you use them. There are no continuing overhead costs to worry about.

This brings us to the second reason for this trend . . . the high cost of operating in-plant repair facilities. In any production process there are bound to be peaks and valleys in the amount of repair work required. This results in disjointed working schedules and expensive overtime. Overhead costs go on regardless of the amount of work being done. There is seldom an even flow of repair work, so that it is virtually impossible to staff the repair shop to meet the varying requirements and emergencies. In addition, major capital expenditures are periodically necessary to keep up to date with testing and repair equipment, materials and the latest techniques.



Steadily rising plant maintenance costs continue upward in first quarter of 1960, estimated to top previous high of 1959 by more than 2%.

By having outside experts handle your repair work you can cut repair costs, improve performance reliability, extend the life of equipment, have more square feet for your own production needs and more people available for production and preventive maintenance work.

Can you afford to do your own electrical repair work?

assures production reliability

mechanical and electrical tests of the machines over the past five years during the annual vacation shutdown periods. Each year they have made recommendations to the company as to the necessary maintenance work to be performed. The contract has completely eliminated large motor down time.

Super Coilife epoxy encapsulation protects the windings of this 10-hp motor from severe acid and moisture conditions which previously caused repeated failure.

In addition to a basic repair service, Westinghouse offers you a score of extra benefits. The repaired equipment will often be better than when new, because Westinghouse actually rebuilds equipment, investigates every opportunity to use up-to-the-minute developments such as exclusive Westinghouse insulations... Thermalastic, Super Coilife, Bondite. At the same time your equipment is being repaired, it can be uprated mechanically and electrically . . . with features of the most recent equipment on the market. Other Westinghouse pluses include complete electrical and mechanical testing equipment, trained specialists for every phase of the job, inventive engineering—difficult to match anywhere.

Westinghouse is providing a comprehensive maintenance and repair service for thousands of plants today and for all types and classes of a broad range of electrical and steam equipment. We invite you to visit any of the 42 Westinghouse modern repair plants. Your Westinghouse representative will be glad to make arrangements for your visit. Take that opportunity to discuss the ways in which Westinghouse can help you prepare a modern maintenance program that will save you money . . . no matter what your in-plant costs are today!

J-95214

YOU CAN BE SURE...IF IT'S

Westinghouse

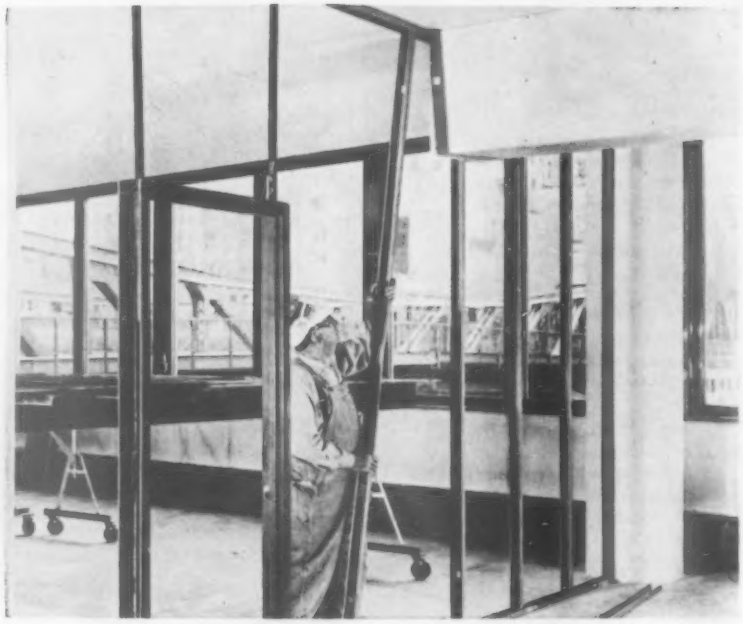
TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE PRESIDENTIAL CONVENTIONS, JULY 10-29

For more about these items, circle numbers on Reader Service Card next to back cover.

Drywall System Goes Up Easily

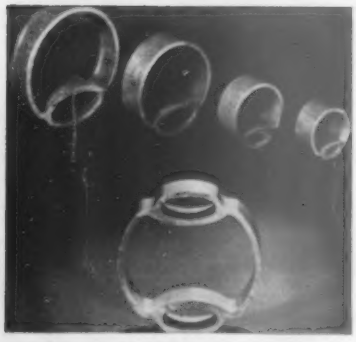
Designed for use in all types of new construction—or for remodeling existing buildings—this versatile drywall assembly offers low initial cost, erection speed, light weight. Non-load-bearing, the USG Metal Stud Partition System consists of a lightweight channel stud set in steel runner tracks at floor and ceiling, and faced with gypsum wallboard. A power-driven, self-drilling screw with a self-dimpling head fastens wallboard to the stud.

Studding is made in widths of 1⅝ in., 2½ in., 3⅝ in., and in a variety of lengths. There are holes punched 12 in. from the ends for electrical wiring. *United States Gypsum Co.* (Circle 195).



Foamed Glass Takes Big Thermal Shocks

A new, lightweight refractory, Foamsil, is 99% pure fused silica glass foamed in a special, ultra-high temperature furnace to create millions of tiny sealed cells. It can cycle from −450 F. to 2000 F. without thermal shocking. It weighs only 13 lb. per cu. ft., has a compressive strength of 200 psi. *Pittsburgh Corning Corp.* (Circle 196).



Tubes Have Built-In Recirculating Lines

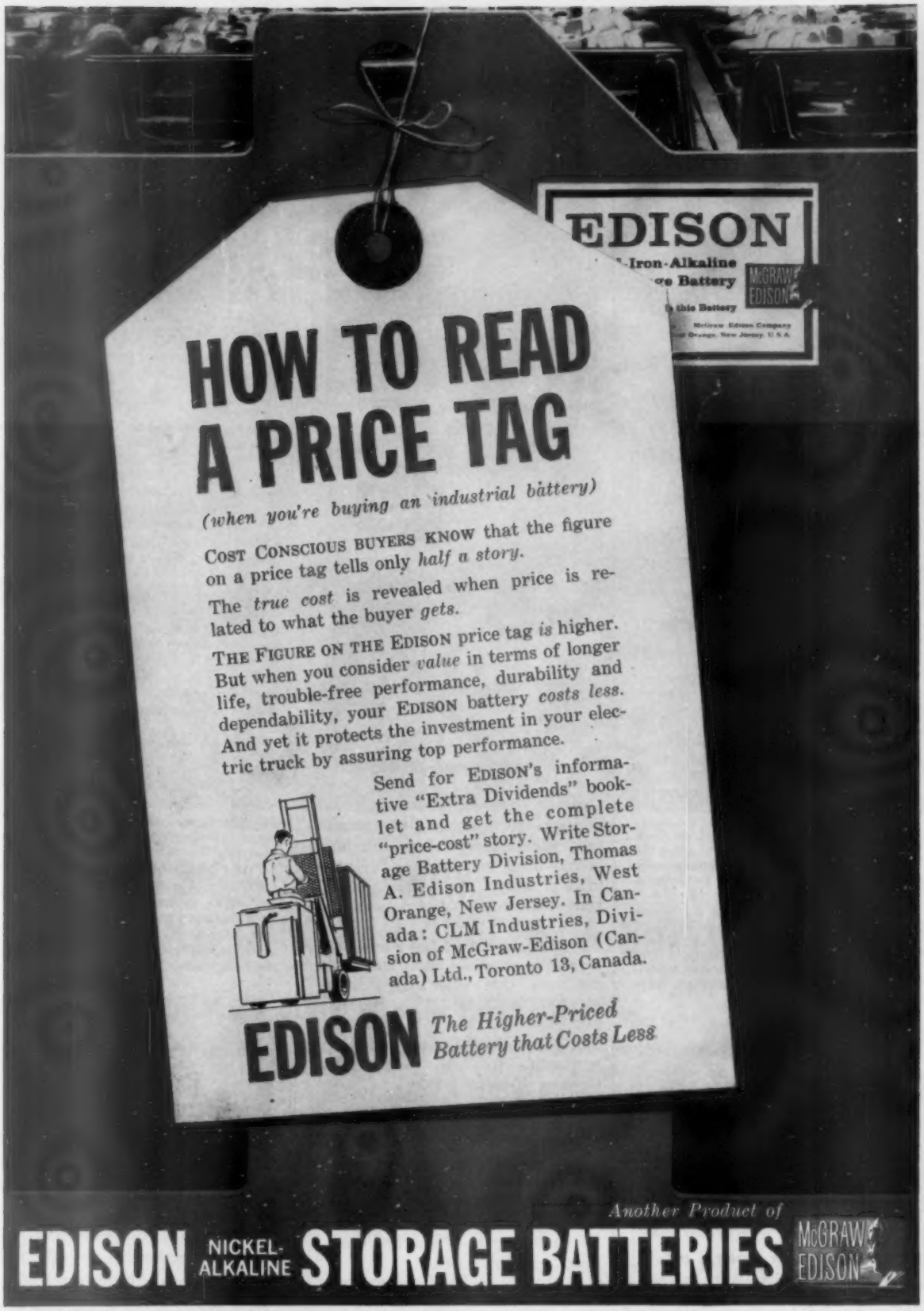
An extruded tubular aluminum product, called Duotrace, has built-in channels for recirculating heating fluids. The heating medium travels through the small oval passageways, maintaining temperature of bulk material in the product line. Comes in 2-, 3-, and 4-in. sizes. *Aluminum Co. of America* (Circle 197).

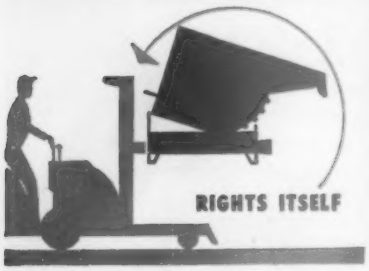
198—Clear Urethane Coatings come in 12 formulations. Solids content ranges from 75% to 35%; viscosities from heavy to light. Said to be tough and water-resistant, the materials' uses range from wall coverings to coatings for shuttles and filter plates. *B. B. Chemical Co.*

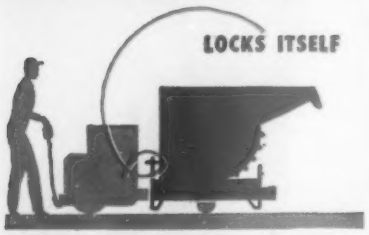
199—Pressure-Sensitive Paper protects all finished surfaces, offers ease of application. Two types of paper are available: KB1 is non-stretchable; KB2 is stretchable, resilient. Comes in a standard 36x48-in. roll or can be ordered in special sizes. *Tech-Industro Co.*

200—Two-Part Epoxy Adhesives come in functional Packettes—combination dispensing and mixing containers. Catalyst and adhesive are contrasting colors; workers mix to uniform color. For bonding metal, glass, Teflon, etc.; cure in about an hour. *Plastic Associates.*

Turn the page


EDISON
Iron-Alkaline
Battery
McGRAW EDISON
HOW TO READ A PRICE TAG
(when you're buying an industrial battery)
COST CONSCIOUS BUYERS KNOW that the figure on a price tag tells only half a story.
The true cost is revealed when price is related to what the buyer gets.
THE FIGURE ON THE EDISON price tag is higher. But when you consider value in terms of longer life, trouble-free performance, durability and dependability, your EDISON battery costs less. And yet it protects the investment in your electric truck by assuring top performance.
Send for EDISON's informative "Extra Dividends" booklet and get the complete "price-cost" story. Write Storage Battery Division, Thomas A. Edison Industries, West Orange, New Jersey. In Canada: CLM Industries, Division of McGraw-Edison (Canada) Ltd., Toronto 13, Canada.
EDISON The Higher-Priced Battery that Costs Less
Another Product of
EDISON NICKEL-ALKALINE STORAGE BATTERIES
McGRAW EDISON





Cuts handling time ...and costs...in half

Here's the fastest, lowest cost method ever devised for handling all kinds of bulk materials . . . hot or cold . . . wet or dry . . . such as:

Punch Press Parts . . . Cinders
Hot Forging or Castings . . . Scrap Metal
Pickles . . . Soybean Meal

A Roura Hopper fits any standard lift truck . . . attached or detached in seconds . . . can't slip off. One man does the entire job. Picks up loaded Hopper with lift truck . . . transports it to destination . . . flips the latch . . . and the Hopper automatically dumps its load, rights itself, locks itself. Cuts costs 50% or more.

Made of 3/16" steel plate with continuous arc-welded joints. Heavier plate if desired, also stainless steel or galvanized. Eight sizes from 1/8 to 4 yards capacity. Fitted with live skids or a choice of wheels. Standard models available for immediate shipment from stock.

ROURA *Self-Dumping* **HOPPER**

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We'll give you full details . . . without obligation . . . if you'll attach this coupon to your letterhead . . . sign your name . . . and mail to . . .

ROURA IRON WORKS, INC.
1423 Woodland Ave., Detroit 11, Michigan

FACTORY / MATERIALS NEWS

Begins on page 222

For more about these items, circle item numbers on Reader Service Card next to back cover.

201—Pipe Insulation, called Thermax, is fabricated of urethane foam, has a seam that allows it to be spread open to cover the pipe, then to snap into shape. For service from −300 F. to +275 F., the material is unharmed by moisture or water. *American Cellular Co., Inc.*

202—Extensible Kraft Paper has a two-way stretch that makes it especially suitable for multiwall bags and other heavy-duty packaging. Paper is readily printed, comes in bleached white, semi-bleached, and natural kraft in several widths and weights. *Scott Paper Co.*

203—Food Packaging Plastic, called Pro-Fax, is the first to win Food and Drug Administration approval through the issuance of a formal food additives regulation. For film or moldings, material can be sterilized at temperatures to 275 F., is heat-sealable. *Hercules Powder Co.*

204—Electrostatic Glass Shields are for use as windows and transparent partitions that drain off electromagnetic interference. The borosilicate glass is coated with a metallic film 1/10 millionths of an inch thick, transmits 70% of visible light. *Corning Glass Works.*

205—Self - Adhesive Polyurethane foam comes in sheets from 1/8 to 4 in. thick, will bond itself to either porous or smooth surfaces. Paper backing peels off for easy application. Comes in several colors; odorless and resistant to heat and water. *Morgan Adhesives Co.*

Turn the page

THE
PENNSYLVANIA PLAN:

100% financing for your new plant

Complete financing for Lease-Purchase of a new plant is available in labor-surplus areas of Pennsylvania through combined efforts of lending institutions, non-profit community organizations and the Pennsylvania Industrial Development Authority. Interest as low as 2%, with deferred amortization, can be applied on up to one-half of total plant cost.

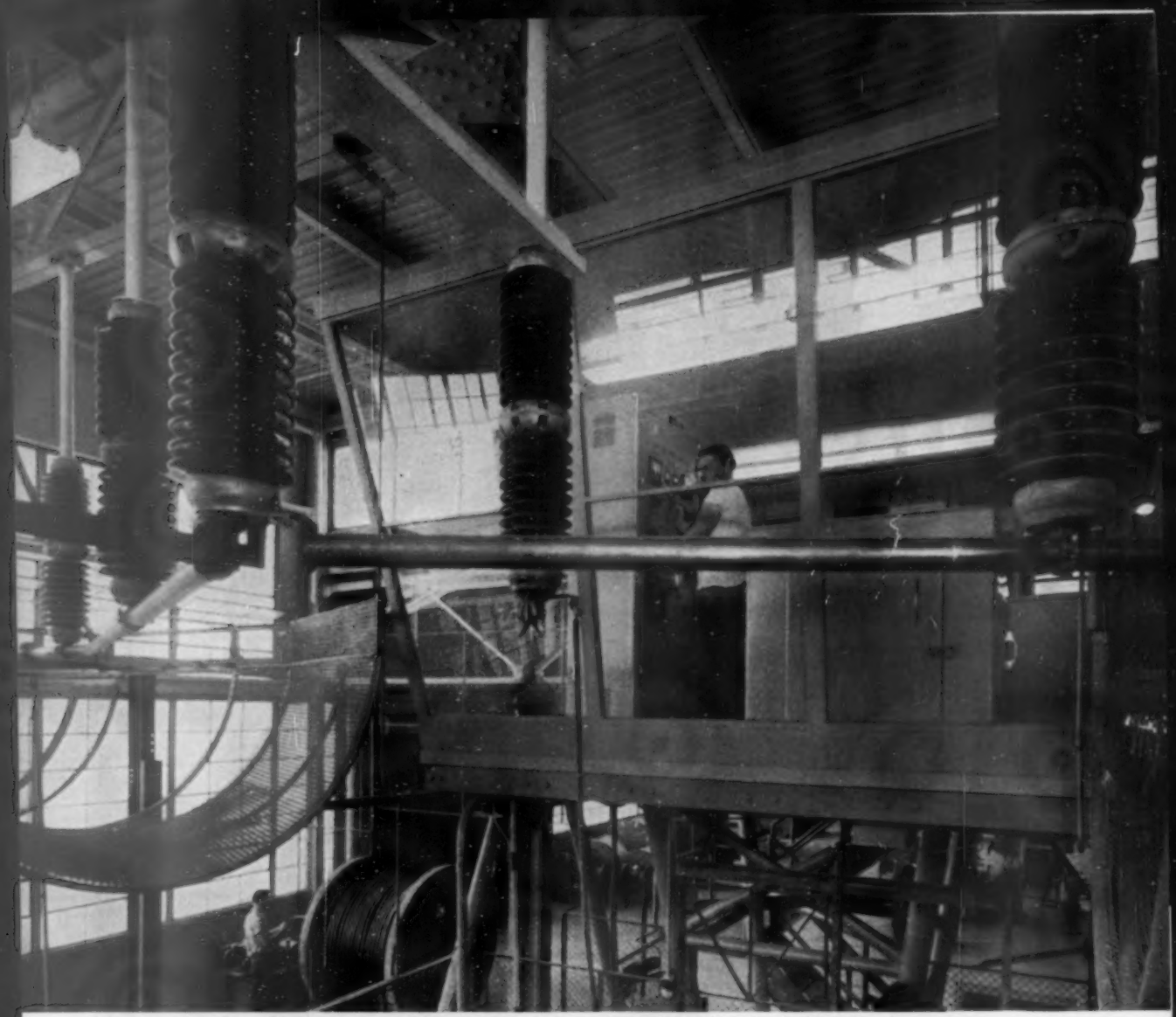
100% financing is also available in other areas of the State, provided by community organizations, banks, insurance companies and other sources. You select the community you want. You specify plant construction details or choose one of several plant "shells" now being readied for completion.

100% Financing at a Glance . . .
Industrial Plant Construction Costs—

Subscribed by local non-profit community sponsored builder-owner corporations.	*20%*
2nd Mortgage Loan, Pennsylvania Industrial Development Authority.	*30%*
1st Mortgage Loan obtained from banks, insurance companies and similar lending institutions.	*50%*
Total financing, secured through local subscriptions and mortgage loans, without cash investment by the manufacturer.	*100%*

For free copy of "Plant Location Services" pamphlet, or for details on 100% financing, write or call:

Pennsylvania Department of Commerce
South Office Building
837 State Street, Harrisburg, Pa.
Phone: CEdar 4-2912



Shown here is a section of final testing area. Voltage tests are being applied to *full reel lengths* of cable before shipment.

ANOTHER BIG REASON WHY YOU SHOULD CONSIDER ANACONDA BUTYL (AB) CABLE—

SPECIALIZED QUALITY CONTROL AND INSPECTION

From the start: Raw-material suppliers are required to submit certified test reports. Then, tests and sampling at our plant offer extra protection even before production begins. **To finish:** Here's the final inspection line where the finishing touches are applied and where every inch of cable is carefully inspected. Perhaps you already know that Anaconda test procedures are much above industry standards. But do you know that test voltages on Anaconda Butyl (AB) Cable are 125% of industry standards—that minimum corona level is 150% of rated voltage to ground?

Quality control at Anaconda is *more* than mere testing and inspection. It is built into every manufacturing step. That's why you can be sure your Anaconda cable will be of high quality—why you can be sure Anaconda Butyl (AB) Cable is the finest rubber-insulated cable you can buy.

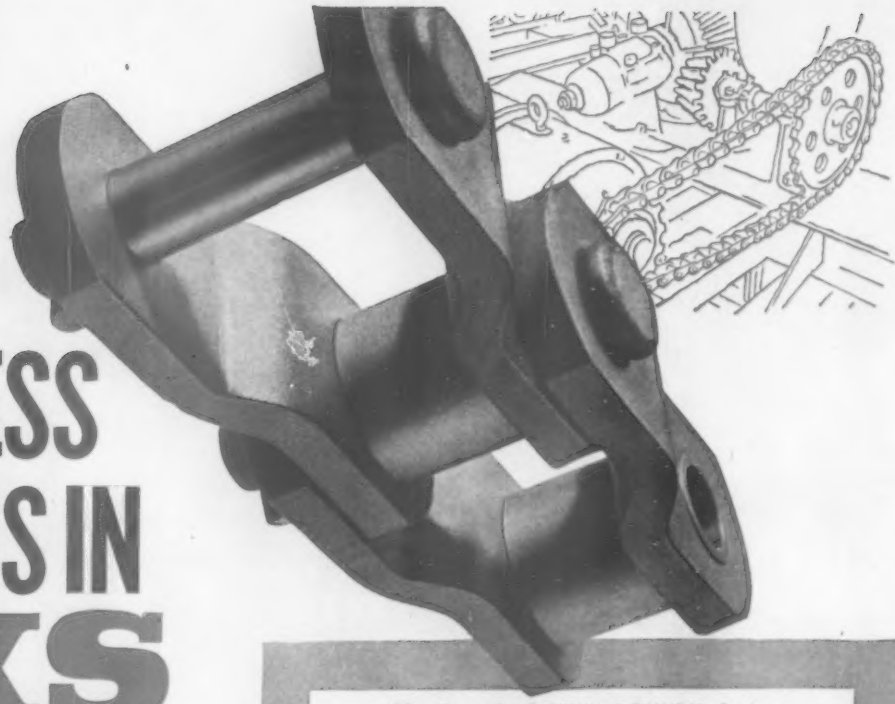
Everything you need to know about Anaconda Butyl (AB) high-voltage cable is neatly summed up in a new booklet, DM-5903, "Anaconda High-Voltage Durasheath* Cable." For your copy, write to: Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y. *Reg. U.S. Pat. Off. 60226

ASK THE MAN FROM

ANACONDA®

ABOUT BUTYL (AB) HIGH-VOLTAGE CABLE

For more facts Circle 515 on Reader Service Card



FAR LESS STRESS IN LXS

THE CHAIN WITH NO "STRESS RAISERS"!

Link-Belt LXS brings long-term economy and efficiency to the most punishing drive and conveying jobs. With its "FULL-ROUND" design, LXS has no stress concentration points . . . none of the sharp corners which frequently shorten the life of many ordinary chains.

LXS is available with straight or offset sidebars. For details, contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.) Ask for our new, comprehensive Catalog 1050.

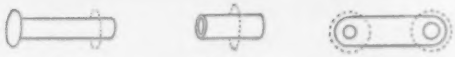
LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

15,063

They're all of "FULL-ROUND" design



PINS BUSHINGS SIDEBARS

"FULL-ROUND" design eliminates traditional stress concentration points in Link-Belt LXS . . . provides maximum live bearing area between pins and bushings. Result: stress is distributed evenly.

Other LXS long-life features include controlled press fits plus use of selected steels and controlled hardening of all parts. All this contributes to greater uniformity, greater endurance.

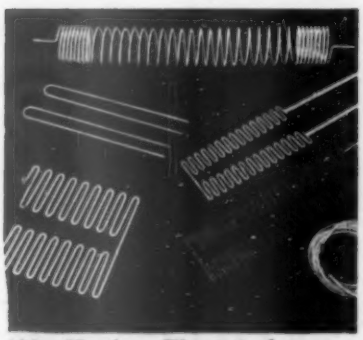
FACTORY / MATERIALS NEWS

Begins on page 222

For more about these items, circle item numbers on Reader Service Card next to back cover.

206—Asbestos-Cement Sheet for structural uses can be bent into a circle as small as 18-in. diameter and nailed within ¼ in. of an edge. The fireproof, rotproof material comes in thicknesses of ⅛ in., 3/16 in., and ¼ in. in standard 4x8-ft. panels. *Keasbey & Mattison Co.*

207—Microfilm Developer, Unibath CC-7, is a single solution processor that performs the functions of developer, short-stop, and fixer. It will process microfilm negatives in 3 to 4 minutes, cannot over- or under-develop properly exposed film. *Cormac Chemical Corp.*



208—Heating Element for controlled-atmosphere furnaces, Chromel-AA is a modified Ni-Cn alloy with high resistance to carbon pick-up at all temperatures. Highly corrosion-resistant. For operating temperatures to 2150 F. *Hoskins Mfg. Co.*

209—Fluorosilicone Sponge Rubber with a closed cell structure is said to have extreme resistance to fuels and lubricants at high temperatures. Physical properties change little from −100 F. to +500 F. *The Connecticut Hard Rubber Co.*

210—Cemented Titanium Carbide cutting-tool materials are fabricated by powder metallurgy, are alloyed with other metallic carbides to give high resistance to edge wear and build-up. Negative rake throw-away inserts are available from stock. *Vascoloy-Ramet Corp.*

Turn the page

Radio messages to your key personnel directly and privately!

. . . with MOTOROLA transistorized Radio Pager

A problem comes up. A key executive is needed on an important matter, a maintenance man is needed to make a repair on the line—now! He's "somewhere in the building" . . . but no one knows exactly where.
With Motorola Radio Paging, you can contact him in seconds—here's how: The switchboard operator sounds a tone in his Radio Pager (and his only). He is alerted instantly. He presses the button on his Pager and hears the full voice message.
Total time elapsed. . . . just seconds . . . and he's on his way to where he's needed.
Executives, engineers, supervisors, maintenance men—all get their messages on Radio Pagers that slip in the pocket or clip to the belt . . . cutting costs by increasing everyday efficiency and meeting emergencies faster.

MOTOROLA HANDIE-TALKIE Radio Pager

"Handie-Talkie" is the Registered Trademark of Motorola Inc.

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
a subsidiary of Motorola Inc.
4501 Augusta Blvd., Chicago 51, Ill.

Please send me full facts on Radio Pager ☐
Have representative call for appointment ☐

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

For more facts Circle 517 on Reader Service Card

• Many plant operating people responsible for specifying conveying systems today are demanding equipment that is right *for them*—that will fully meet *their* individual requirements. They are looking beyond the price—to design and quality.

Mathews Engineers are giving these people a complete conveyer service—from the first proposal through installation—and equipment that is delivering outstanding performance.

GENERAL OFFICES ..... MATHEWS CONVEYER COMPANY
Ellwood City, Pennsylvania
WESTERN DIVISION ..... MATHEWS CONVEYER COMPANY WEST COAST
San Carlos, California
CANADIAN DIVISION ..... MATHEWS CONVEYER COMPANY, LTD.
Port Hope, Ontario, Canada

Over Fifty Years of Leadership in Mechanized Handling

MATHEWS

228 **For more facts Circle 518 on Reader Service Card**

FACTORY / MATERIALS NEWS
Begins on page 222

For more about these items, circle item numbers on Reader Service Card next to back cover.

MATERIALS LITERATURE

211—Insulating Varnishes, their properties and uses, are covered in this 4-page selection chart. Lists military specifications, baking times, and solvents for 18 products formulated for the electrical industries. *John C. Dolph Co.*

212—Molybdenum Products and alloys get non-technical coverage in this 24-page booklet. Gives full details on sizes, forms, weights, and conditions of use of company's line of products. Charts, tables. *Climax Molybdenum Co.*

213—Color-Tar Coatings are described in an illustrated 16-page booklet that lists resistance properties, typical uses, packaging. Large, easy-to-read tables give full specifications. *Allied Chemical Corp.*

214—Corrosion Test data on wrought iron and 10 structural steels in salt and lake water environments are given in 12-page report. Includes corrosion-time curves, weight-loss tables, conditions of 8-year test. *A. M. Byers Co.*

215—Benzotrifluoride and its isomers are reviewed in this 12-page technical bulletin. Contains properties, toxicity, applications, and shipping information. Uses range from dye-stuff making to lamprey control. *Hooker Chemical Corp.*

216—Silicones are surveyed in an 18-pager that covers silicone fluids, lubricants, resins and adhesives, dielectrics, rubber. This engineering guide has tables, graphs, photos, and reply postcards to get additional info. *Dow Corning Corp.*

217—Electrical Surface-Coating insulating material, Limitrak, is described in this 8-pager. Booklet discusses material's physical and electrical properties, its arc and track resistance. Photos. *Westinghouse Electric Corp.*

Easily-installed PPG Neoprene-coated Duct Liner now meets fire requirements, provides extra margin of safety on ductwork installations.

NOW—PPG Fiber Glass Duct Liner Carries the UL Label

PPG Neoprene-Coated Superfine Duct Liner Meets All Requirements of NBFU Bulletins No. 90-A and 90-B for Ducts

YOUR ASSURANCE OF SAFETY

PPG is proud to announce that its Neoprene-coated Superfine Fiber Glass Duct Liner has been thoroughly tested according to the condition determined by National Board of Fire Underwriters, and has met the Board's rigid safety requirements in compliance with Bulletins No. 90-A and 90-B for ducts. It now bears the label of the Underwriter's Laboratories, Inc.

For you, this means that PPG Neoprene-coated Fiber Glass Duct Liner meets fire requirements and provides that extra margin of safety on any ductwork installation.

PLUS ALL THOSE EXTRA PPG ADVANTAGES...

. . . such as lightweight, easy handling, easy cutting and piecing, low wastage, fast installation, fine acoustical qualities, good thermal barrier characteristics, low resistance to air flow, no air erosion; and lifetime service, because it won't rot or decay, is not affected by humidity or dryness.

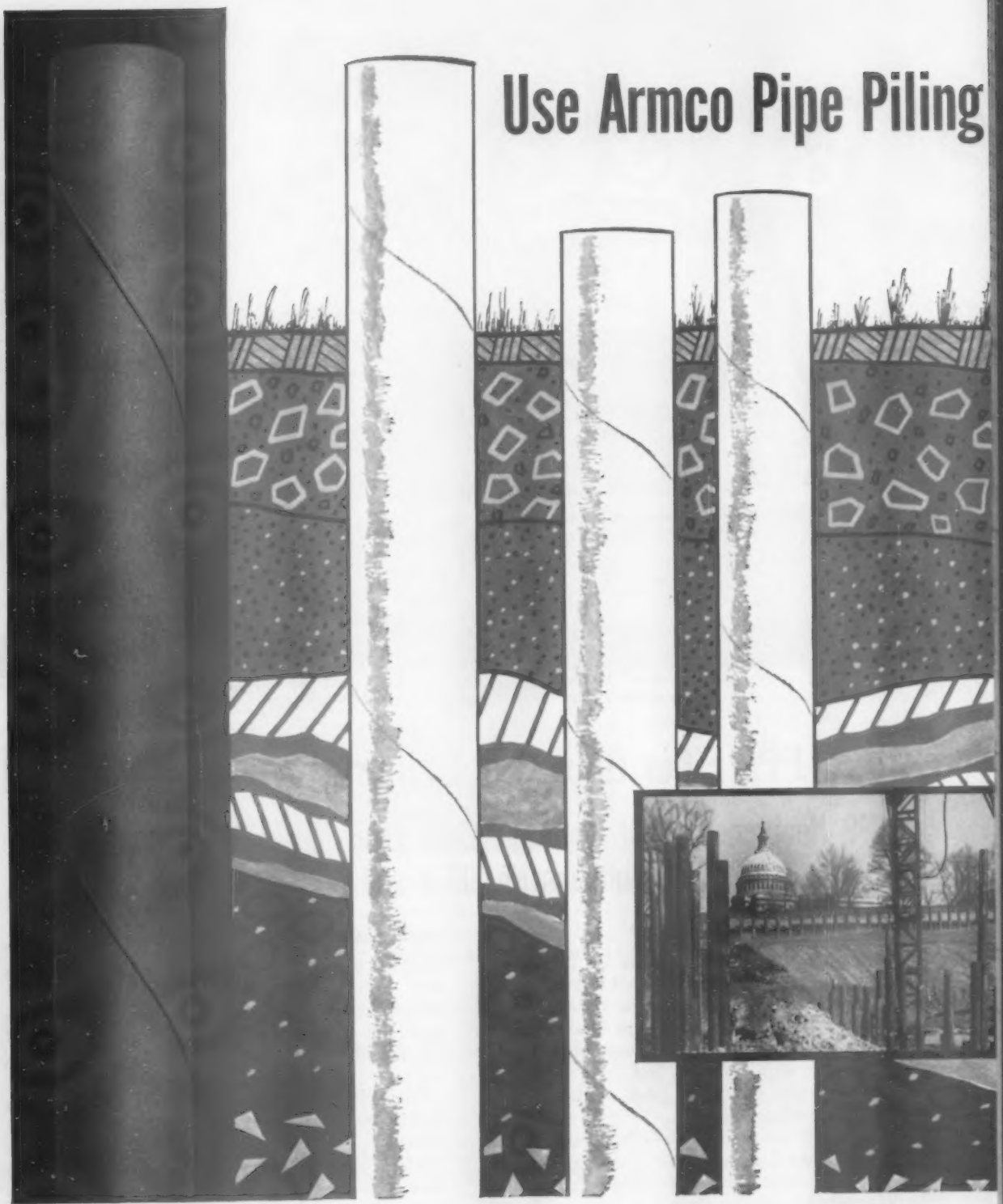
Give PPG Fiber Glass Duct Liner a try. It offers you a combination of top-flight insulation and economy. For full information, call your nearest PPG Fiber Glass Sales Office, or write *Pittsburgh Plate Glass Company, Fiber Glass Division, One Gateway Center, Pittsburgh 22, Pennsylvania.*

Sales Offices: Atlanta, Attleboro, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Fort Wayne, Houston, Kansas City, Louisville, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis and Washington.

FIBER PPG GLASS PITTSBURGH PLATE GLASS COMPANY

For more facts Circle 519 on Reader Service Card

Use Armco Pipe Piling



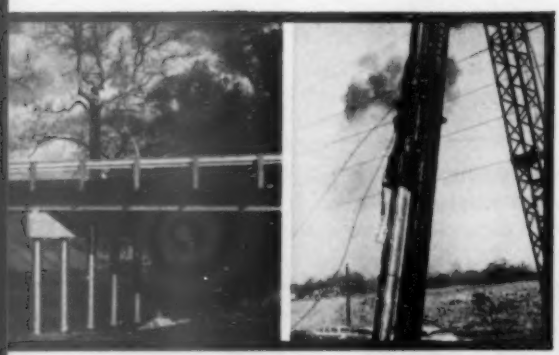
...You can check it where it counts most

IN THE GROUND

When you specify and use Armco Steel Pipe Piling, you'll find advantages that no other type of foundation product can deliver. *After it's in the ground,* you can make a quick, sure check for alignment and watertightness. A light or reflector lets you see all the way to the bottom. You *know* where each pile goes—no doubt about it.

You can get Armco Pipe Piling in 132 different diameter-wall thickness combinations. Lengths are practically unlimited. In addition, you can meet foundation pipe needs from lightweight Armco HEL-COR® Pile Shells. These shells are available in diameters from 10⅝" to 22". Thus, it is an easy matter to specify an Armco Foundation Pipe that meets your *exact* requirements. Get details now. Send coupon for 16-page catalog on Armco Foundation Products. Armco Drainage & Metal Products, Inc., 5670 Curtis Street, Middletown, Ohio.

New steels are born at Armco



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Department F
5670 Curtis Street, Middletown, Ohio
Send your catalog on Armco Foundation Products

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Company_____

Street_____

City_____ Zone_____ State_____

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company • The Armco International Corporation • Union Wire Rope Corporation

Recent Economic Growth — The Numbers Game

If it truly portrayed recent rates of economic growth in the United States, the report on employment, growth and price levels recently issued by the staff of the Joint (Congressional) Economic Committee would point up scarcely less than a national disaster. Among other things, it would document impressively Premier Khrushchev's crack that "the capitalist steed the United States is riding . . . is worn out."

One of the major findings of the Joint Committee's staff (in the Eckstein Report, named for its staff director Otto Eckstein) is that between 1953 and 1959 the average rate of growth of physical output in the United States was only 2.4 per cent per year. This is scarcely more than half the average annual rate of growth of 4.6 per cent the staff found to have prevailed between 1947 and 1953.

Happily, however, the report does not reflect the basic economic realities. Its finding on relative rates of economic growth for the two periods is a statistical *tour de force* which, by the selection of certain figures and certain dates, distorts the record of America's long-term economic growth.

Playing The Numbers Game

By the selection of appropriate starting and terminal periods it is possible to document almost any rate of economic growth that is desired. The table at the bottom of this page shows you how this can be done. It will also show you how the Eckstein staff worked out its shocking contrast in growth rates. The table is built like a schedule of airplane fares between different cities. The postwar years 1946 through 1959 are put down on two axes. One runs down the left hand column, the other runs across the top of the table. Put your finger on the point where the two axes intersect and you have the average rate of growth for the period covered.

ANNUAL AVERAGE GROWTH RATES OF THE U.S. ECONOMY, 1946-1959*

(Percent increases, starting year to terminal year, of GNP in 1954 dollars).

Starting Year \ Terminal Year	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1946	X	–0.1	–1.9	–1.2	3.0	3.9	3.8	3.9	3.2	3.7	3.6	3.4	2.9	3.2
1947	X	X	3.8	1.8	4.1	4.9	4.6	4.6	3.7	4.2	4.0	3.8	3.2	3.5
1948	X	X	X	–0.1	4.2	5.3	4.8	4.7	3.6	4.3	4.0	3.8	3.1	3.4
1949	X	X	X	X	8.7	8.1	6.5	6.0	4.4	5.0	4.6	4.2	3.5	3.8
1950	X	X	X	X	X	7.4	5.4	5.1	3.4	4.3	3.9	3.6	2.9	3.3
1951	X	X	X	X	X	X	3.4	3.9	2.0	3.5	3.2	3.0	2.2	2.8
1952	X	X	X	X	X	X	X	4.4	1.3	3.6	3.2	2.9	2.0	2.6
1953	X	X	X	X	X	X	X	X	–1.6	3.2	2.8	2.6	1.6	2.4
1954	X	X	X	X	X	X	X	X	X	8.1	5.1	4.0	2.4	3.2
1955	X	X	X	X	X	X	X	X	X	X	2.1	2.0	0.5	2.0
1956	X	X	X	X	X	X	X	X	X	X	X	1.8	–0.2	2.0
1957	X	X	X	X	X	X	X	X	X	X	X	X	–2.3	2.0
1958	X	X	X	X	X	X	X	X	X	X	X	X	X	7.0
1959														

*Compound rates of growth

For more facts circle 521 on Reader Service Card→

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Developed Exclusively for Tri-Clad® '55' Motors

NEW THERMO-TECTOR SYSTEM POSITIVELY ELIMINATES OVERLOAD BURNOUT

Allows Maximum Motor Output - - Safely!

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Thermo-Tector system uses no costly amplifying relays or special circuitry, works with any General Electric motor controller.

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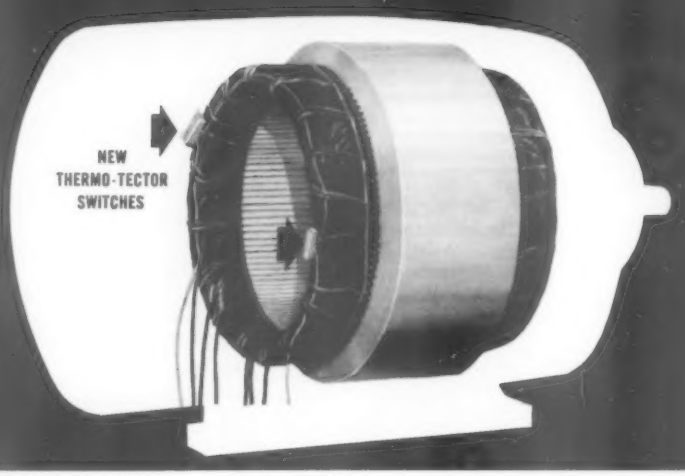

You get ***full output*** from Tri-Clad '55' motors with Thermo-Tector protection. No operating "safety margin" is necessary since Thermo-Tector switches react instantly to prevent damage from *any* type of winding overload. New General Electric Thermo-Tector switches—buried deeply in the coils of the Tri-Clad '55' motor—are so durable they handle size 4 contactor coil current with ***no costly amplifying relays.*** Any conventional G-E motor controller works with the Thermo-Tector system.

Thermo-Tector protection is available on ***all*** Tri-Clad '55' motors in frames 254U-445U. For more information, contact your G-E Apparatus Sales Office or write for Bulletin GEA-7092, Section 866-2, Schenectady 5, N. Y.

SMALL AC MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC

Following this procedure, you can find growth rates ranging all the way from —2.3 per cent, between 1957 and 1958, to +8.7 per cent, between 1949 and 1950, along with almost any other rate you would choose for various years and sequences of several years over the postwar period.

For example, if you want to demonstrate that the postwar growth rate through 1953 was less than 4% per year, you take off from 1946, include a drop of 0.1 per cent between 1946 and 1947, and come up with a growth rate for the 1946-1953 period of 3.9 per cent. But if you want to show it was quite high, you take off a year later, from 1947 (which drops out that dismal —0.1 per cent for 1947) and come up with a fine growth rate of 4.6 per cent for the 1947-1953 years.

Statistical Hocus-Pocus

That's what the Eckstein staff did. It took off at one end from a year when there was just about no growth, went to the Korean War boom year of 1953 at the other end, and got that average growth rate of 4.6 per cent. Then it took off from the Korean War boom year of 1953 and ran to the year 1959, when business was recovering from a recession and suffered through a steel strike of 116 days, to come up with its 2.4 per cent growth rate for the second postwar period. As the table indicates, by taking off a year later (1954) the average growth rate would have become 3.2 per cent, and if the take off had been 1949 it would have been 3.8 per cent.

There are those who, in nontechnical terms, would characterize this as statistical hocus-pocus. There are also those who would see in it an element of political hocus-pocus, too. This is because the years 1947-53, when the Eckstein staff found there had been the healthy 4.6 per cent growth rate, were roughly years when we had a Democratic president, while the anemic growth rate of 2.4 per cent it calculated for the subsequent years was for years of a Republican presidency.

Actually it can be shown that the civilian part of our economy has had more rapid growth during the Republican administration than it had during the Democratic years. If military expenditures are subtracted from the national ouput, the resulting growth rate for 1953 to 1959 is slightly higher than for 1947 to 1953.

However, we do not question the *bona fides* of the Eckstein staff. **But we do assert that it has produced a statistical picture of the postwar growth of the American economy which is dangerously misleading both at home and abroad.**

Abroad, the report appears to give official documentation to the propaganda line that the Soviet economy is running rings around the U.S. economy in growth, and that it is Communism a country should choose if it really wants to develop rapidly. Building on a much smaller economic base than the U.S.A., the Soviet Union — as well as almost every less advanced nation in the world — is bound to show a larger percentage increase in output than the U.S.A. But the Eckstein staff calculation gives the Communists ammunition they don't deserve.

Are We Facing A Crisis?

The contrast drawn by the Joint Committee staff in postwar U.S. growth rates suggests that we are facing scarcely less than a crisis through paralysis of our economic growth which calls for drastic remedies. But this, as the full 1947 to 1959 growth record set forth in the table makes clear, is very definitely not the case. Our over-all postwar rate of growth, as measured by the gross national product in physical terms, has been 3.5 per cent per year, a rate nearly double the long-term growth rate of 2 per cent per year between 1909 and 1939. In the continuing fluctuations in the rate of growth which more or less inevitably characterize a relatively free economy, we have had some downs in recent years. **But our economy is now on the upbeat again. And at the end of this year, the U.S. economic growth rate for the postwar period can be expected to be 3.7 per cent per year.**

It is extremely important for the United States to continue to maintain this rate of economic growth or even to surpass it. Upon this effort depends our capacity to meet our defense requirements without dangerous strain, to provide an adequate margin for foreign aid, to improve our own productive facilities, and to continue to raise our own standard of living.

How not only to maintain but possibly improve upon our postwar pace of economic growth will be the subject of strenuous debate in the months ahead. However, the debate will have a much better chance of being constructive if the postwar growth record is seen in proper perspective. To this end one of the first things to do is to junk panic rousing statistical portrayals such as that in the Eckstein report.

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Donald C. McGraw

PRESIDENT

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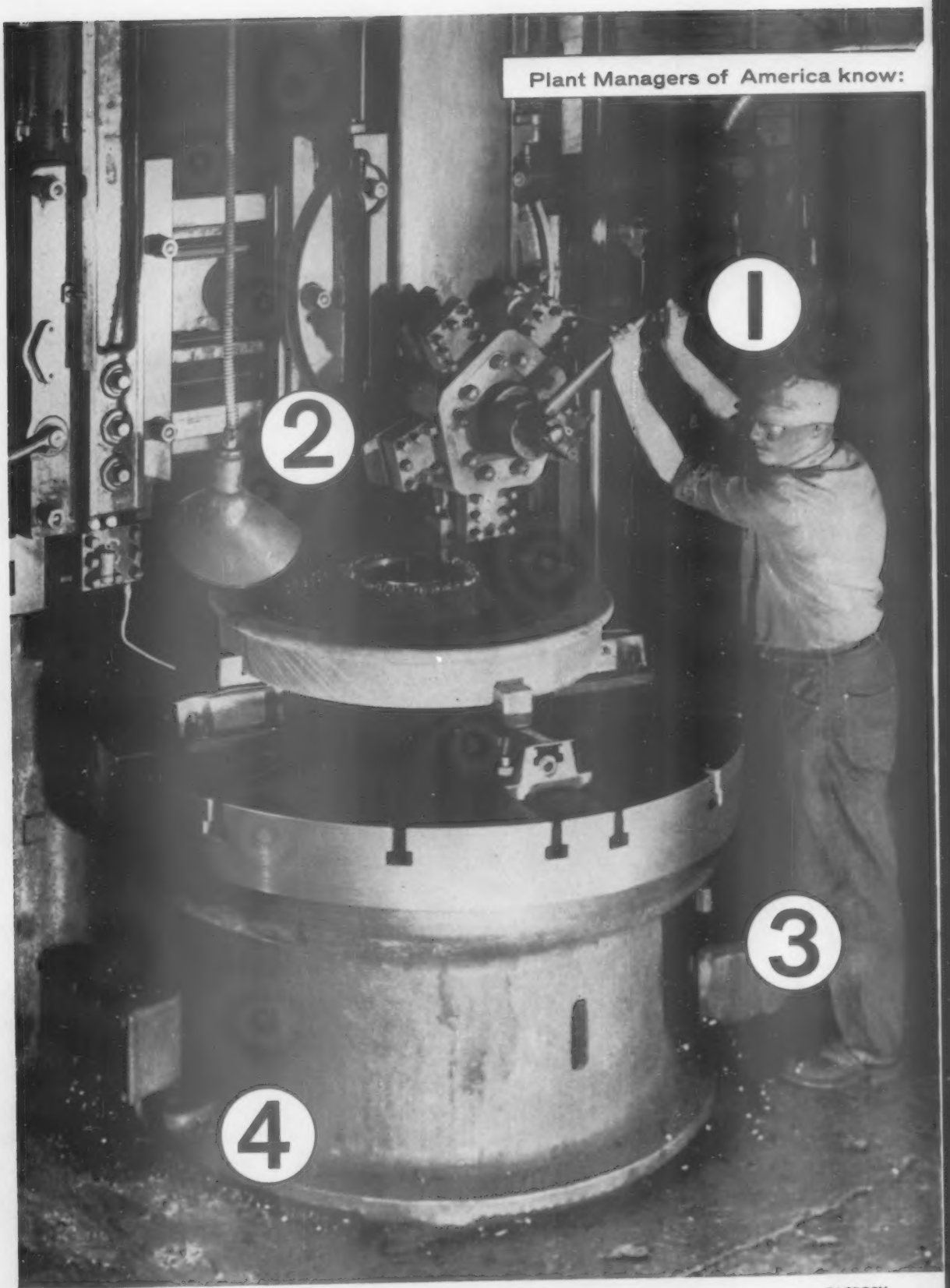
Plant Managers of America know:
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Just a routine boring mill operation, but what happens to production if . . .

1. Man was not wearing safety goggles . . . flying chips struck eyes.
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3. Man was not wearing safety-toed shoes . . . heavy object falls on foot.
4. Work area became cluttered . . . man stumbled and injured himself.

Let's face it: When workers do a job enough times, they tend to take safety for granted. That's where accidents creep in. They may relax their vigilance . . . just enough to let accident-influencing conditions develop. Next thing is . . . an accident . . . which results in injury, damaged material or equipment.

To keep accidents down and production stoppages to a minimum, many companies have turned to American Mutual. AM Safety Engineers offer advice and counseling that can help you improve your safety record. But equally important, they have the production man's interests in mind: the protection of men, material and machinery so that production flows without interruption.

Many AM policyholders who have put the AM man's suggestions into operation not only benefited from improved production, but as a result gained in lower insurance costs . . . which in turn may be reflected in lower product costs and higher profit potential.

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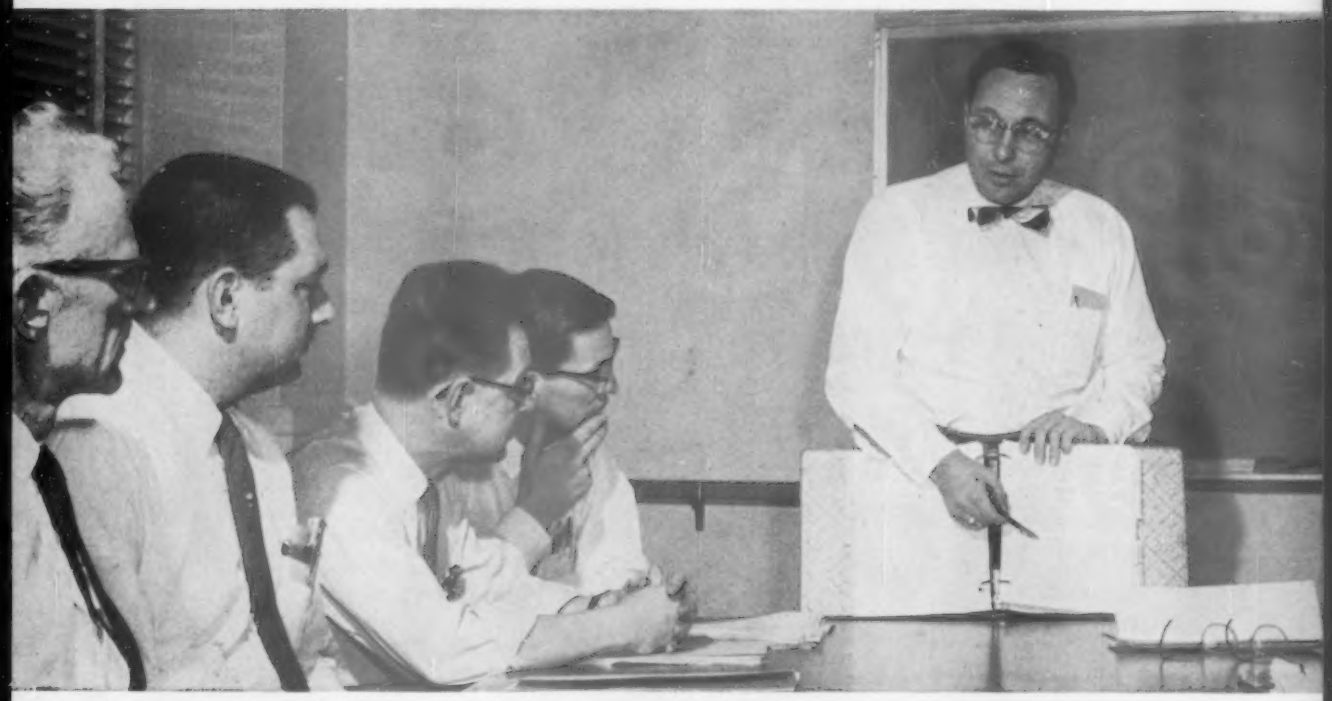
"It's really amazing how utility costs can be cut once you start looking around . . . and keep pressing," says Alexander Beebee, shown here with the committee that cut utility bills 25%.



WASTED UTILITIES ARE A DRAIN ON

Utility bills can run as high as 20% of direct labor costs. They did at Rochester Products Division (RPD) of General Motors (Rochester, N. Y.). Result: a $1 saving in utility costs is worth $7 in product sales. And it has been our experience that a 25% cut is possible—even 35% isn't just an empty pipe dream.

We didn't need any more reason than this about two years ago to draft our comprehensive utilities conservation program. Already we have obtained these significant reductions: Compressed air, 11%; water, 75% (saving over 2-million gallons per day); steam, 36%; gas, 10%; and electric power, 2%. Don't be fooled by that last 2% savings, because the cost of electric power is by far our biggest, running into six figures.

At RPD we attacked the most rewarding areas first. These successes encouraged further scrounging and digging. Often the less obvious opportunities are paying back the biggest rewards. Here, and on the pages that follow, are some of the many ways utility costs were trimmed.

ALEXANDER M. BEEBEE, JR., Plant Engineer
Rochester Products Division of GMC, Rochester, N. Y.

STEAM

• **Cold chemical cleaners**—We investigated and pursued the use of chemical cleaners, using cold water, for both production processes and maintenance cleaning. This has meant a tremendous saving in Btu.'s.

• **Balanced make-up air**—Our process-air exhausts near the center of the plant were creating a negative pressure. Since there wasn't enough make-up air, this pulled in cold air through cracks and openings in the building periphery, made these areas chilly and hard to heat. Low-hanging peripheral outlets provided enough air to relieve the situation. Moreover, we are now able to shut down the make-up heating system during weekends, and warm the plant quickly on Monday mornings. Previously, start-up heating was so slow the plant had to be heated all weekend.

• **Tank heat seal**—Use of a mineral-oil heat seal on top of hot liquid-filled open tanks has drastically cut

YOUR PLANT'S DOLLARS

our surface radiation losses. This heat seal forms a foam insulating layer that is non-miscible.

• **Thermal insulation**—Everybody knows all about the economics of insulation, but it's all too easy to overlook the many bare spots on hot containers and pipelines. We are really allergic to uncovered areas, find that insulation pays off in less than a year.

• **Exhaust control**—Our paint spray booths consume a lot of 70 F. in-plant air. We minimize the amount of exhaust (also wash water and electric power) by use of a "mat switch," like those at supermarket doors. This is placed under a rubber mat on which the operator stands. When he steps off the mat, the switch shuts off the fan and water-wash pump.

• **Efficient exhaust hoods**—We don't use large hoods over entire work stations. They throw away too much warm air. All hoods hang low and are designed especially for the problem. For example, in a process that generates kerosene fumes we use a small-diameter Inconel tube to suck off the fumes from close to their origin. This high-velocity design replaced a large hood, cut air waste by a husky 99%. Gains of this kind can be made all over the plant.

Turn the page

GAS HEAT has been completely eliminated in this drying operation. Now a high-volume, high-velocity blower dries the parts.

WATER CONSUMPTION has been reduced by plugging up some of the holes in the hot water feed of these circular wash basins.

STEAM COILS have been removed from this washer tank now that cold cleaners have taken over the job, eliminating all heating.

"THIS LUBRICANT WAS THE ANSWER TO OUR MAINTENANCE PROBLEM"

says the MOLYBDENUM CORP. of America

"We use a Hardinge conical ball-mill driven by a large gear and pinion in the processing of tungsten and molybdenum concentrates. Silicious dust from the grinding was absorbed by the soaplike lubricant we were using and formed a highly abrasive compound. Frequent replacements of gears and pinions were major maintenance expenditures. The change to LUBRIPLATE Lubricants was the solution to our problem . . . not a gear nor pinion replacement in four years."

William F. Allen, Works Manager

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

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Begins on page 238

MAXIMUM POWER FACTOR is obtained by controlling excitation of synchronous motors that drive compressors.

WATER

• **Methods for recovery and re-use**—In general, RPD has found these techniques produce the biggest and most obvious savings. They do require capital investment. But in our experience, investment for water reclamation is recaptured within two years or less. We re-use recovered cooling water in several ways, such as for mold cooling in our die-casting machines.

• **Modified wash basins** — We plugged up about 40% of the holes in the peripheral hot-water feed of our circular wash basins. We plugged holes in areas where no one could stand anyhow. Before this move, 40% of the water—hot water at that—was wasted.

• **Spring-loaded valves**—We put spring-loaded valves on all manual make-ups and at hose outlets (this idea is also useful on air hose).

• **Special plating hook-ups**—Here's a big bonus area. We adopted a counterflow principle of rinsing that uses cascade flow from the last to the first tanks, and cuts demand 50% or more.

• **Condensate recovery**—Formerly, all condensates from plating operations were discharged to the sewer for fear of contaminates. Now a conductivity meter polices various return lines. Instead of unwanted condensate being automatically dumped, it is emptied into a 20,000-gal. tank. In case of contamination, a red light shows on a central control board, indicating the general plant area where a failure has oc-

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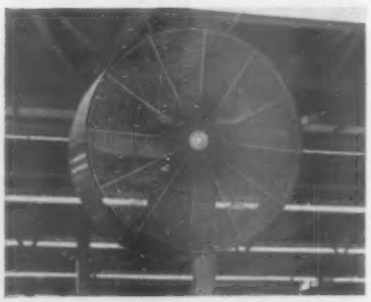

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- 3 ft. Blades
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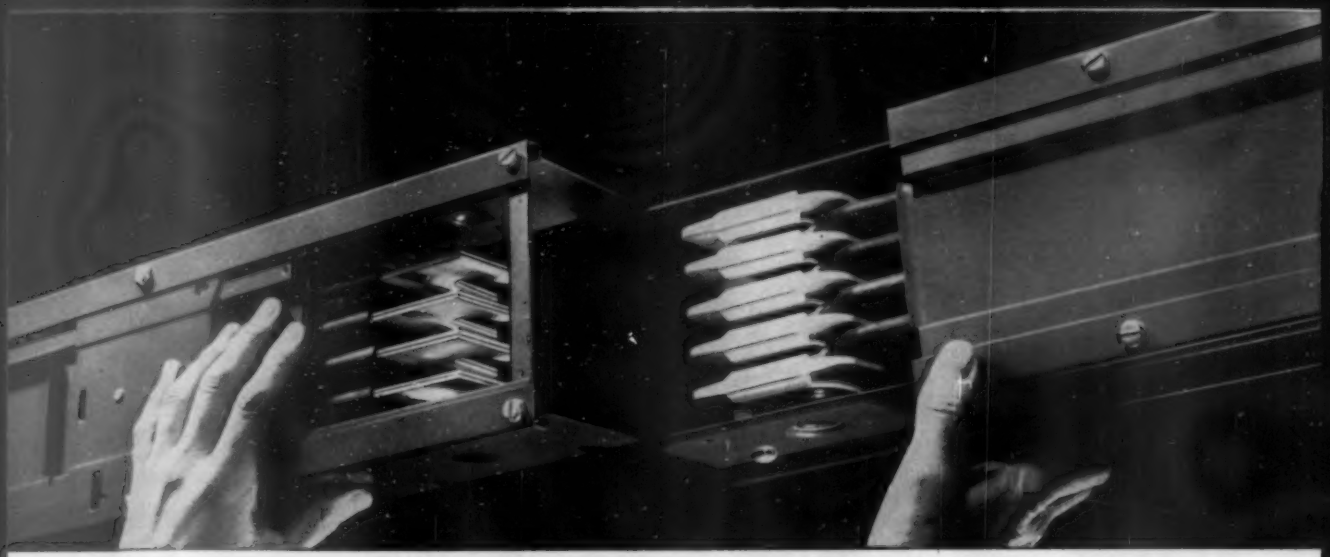

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You can install XL BUStribution® Duct easier, faster than any other duct because of these exclusive new design features . . . plated aluminum bus bars with KEYED ENDS slip together fast, align automatically for proper position. There's no fumbling and fitting . . . ONE INTEGRAL BOLT tightens fast, locks joint positively under a ton of pressure. Bolt tightens against bus bar, not against the casing . . . TEN-FOOT SPANS take fewer hangers and less time to install than ordinary duct.

New XL BUStribution Duct is 3 ways safer, too. It's the only true dead-front duct, the only one with exclusive Safety Door, the only one with Safety Plug. And it reduces duct weight on building structure as much as 40%. Ask your BullDog representative to arrange for a demonstration . . . you'll see how fast to install and how safe new XL BUStribution Duct really is.

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SINGLE INTEGRAL BOLT puts a ton of pressure on keyed bus ends. Joints lock tight *fast*, stay locked.

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STOP IT, YOU LUNKHEADS! THIS NEW KOLLMANN CAN OPEN THAT DRAIN LINE IN FIVE MINUTES WITHOUT DIGGING!
WATCH THIS! THE BULL TOLD MAINTENANCE NEXT TIME THAT DRAIN PLUGGED HE'D FIX IT FOR GOOD--SO MAINTENANCE BOUGHT A KOLLMANN 500 ON THE QUIET AND WAITED TO SPRING IT ON HIM!
QUESTION NOW IS WILL THE BULL HATE MAINTENANCE FOR LETTIN' HIM GET IN-TO A TWO-DAY MESS... OR WILL HE BE SO HAPPY TO STOP LOSIN' DOWN-TIME FROM PLUGGED DRAINS HE'LL VOTE 'EM ALL A RAISE!
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it's faster— with a KOLLMANN!

• Whether it's congealed oil and chips in a shop drain, grease in a hand basin, "caking" in a supply line or roots and rags in a sewer... *when a flow line plugs, there's trouble and "down" time in the plant.*

That's when the Kollmann 500 is literally "worth its weight in man hours." Fast, rugged and easily operated by one man, this dolly-mounted unit can get to the trouble and clear the most stubborn stoppage often faster than you could make a phone call.

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Especially designed for industrial use, the 500 handles up to 200′ of sectional cables through traps and bends on lines from 3″ to 10″. Quickly adapts to lines as small as 1¼″. Explosion-proof, air and gasoline power available. Quickly pays for itself in saving "down" time.

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LEADERS IN POWER DRAIN CLEANING EQUIPMENT SINCE 1936

DON'T WASTE UTILITIES

Begins on page 238

curred. A few checks of strategic equipment can then quickly isolate the offender for repairs before contamination becomes critical.

• **Direct mixing**—When possible we use a direct mixing valve instead of a heat exchanger to temper water to specified temperatures. It not only saves water and Btu.'s, but eliminates pumps, refrigeration, heat exchangers, valving, and the like. A case in point is the water used for sealing our vacuum pumps for carburetor testing. Such testing requires uniform conditions, which can be affected by varying temperatures of inlet water. So we re-use the outlet water (which has gained heat in the process) by mixing it with colder water from a cooling tower, and tempering it down to a consistent temperature. This set-up is equal to a costly 750-gpm. system.

• **Temperature-rise controls** — Water waste is eliminated in all cooling systems of hydraulic equipment by these controls. Placed in the discharge water line, they restrict flow to a temperature at least 10 degrees higher than inlet temperature.

• **Water conditioning** — Treating water for hardness reduces scale deposits. Thus, when it is used for heat transfer, less water is needed. A major indirect benefit: lower equipment maintenance costs.

• **Orifices**—We installed many orifices in outlet pipelines to restrict water flow by up to 80% and thus stop excess usage.

• **Drift eliminators**—They are installed in cooling towers to minimize water spray losses caused by windy weather or by the action of the cooling fan.

• **Mechanical refrigeration** — We had to use large amounts of 70-deg. city water to cool the braze-furnace atmosphere gas we generate. Cooling-tower water at 85 degrees was too warm. Traces of water vapor left in the gas in this cooling process required the basic exothermic mixture to be enriched with a higher quality endothermic gas that cost three times as much to generate. We substituted a mechanical refrigeration system for the cooling water, also eliminating the need for endothermic gas.

Turn the page

THERE'S A REAL DIFFERENCE IN SAFETY-SWITCH SAFETY!

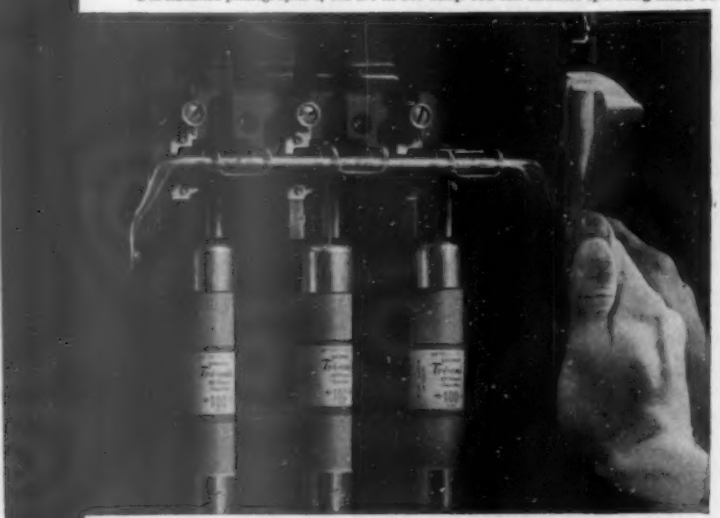
The *real* difference in safety . . . and the difference is *very* real . . . lies in switch performance under electrical load. You can spot this difference instantly when you compare the action of BullDog Vacu-Break® Safety Switches.

When you operate Vacu-Break Safety Switches under load, there is no blinding flash, no dangerous arc "explosion". The exclusive Vacu-Break design double-breaks the circuit, confines the arc within the enclosed switch head, smothers and extinguishes it instantly. Maintenance of contact points is virtually eliminated, and *you don't have to open the switch-box door to know the contact is broken.*

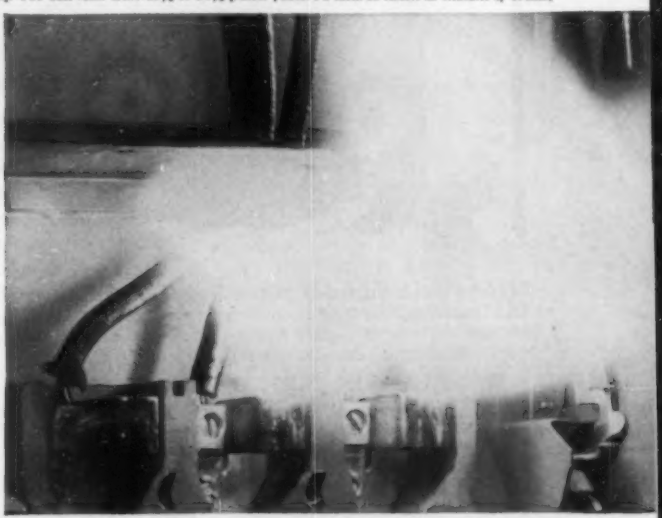
The operating handle is connected directly to the Vacu-Break heads. Push the handle "Off" and contact is broken positively every time. There are no toggles, triggers or springs to depend on. You know the switch is "Off" without looking.

Clampmatic® assembly gives clamped pressure contact, speeds "break". This means positive, safe operation, and long, trouble-free switch life. In safety switches, the *real* difference in safety lies in design and performance. Compare BullDog Vacu-Break Safety Switches with other types, and then *see* the difference!

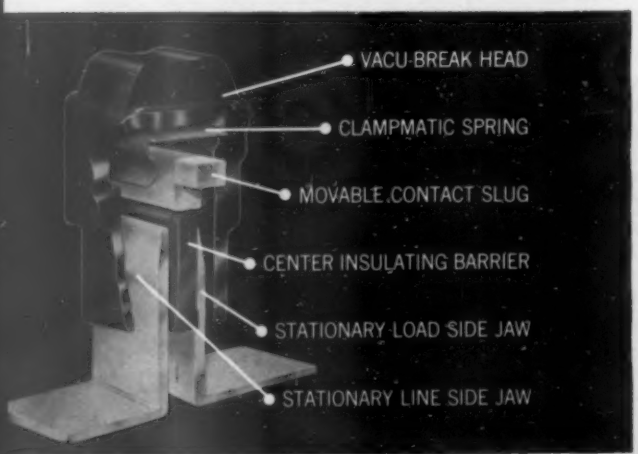
Unretouched photographs of the arc in 100-Amp 600-volt switches operating under 90-Amp 440-volt load with 40% to 50% power factor. Pictures taken at instant of break.



Vacu-Break Safety Switches confine dangerous, destructive arcs inside arc chambers, and smother them instantly.



Open knifeblade switches permit arc "explosions", burning and pitting contact points. The result—fire hazard and switch damage.



Cutaway of Vacu-Break switch head, showing movable contact slug inside arc-smothering closed chamber. Clampmatic spring assembly gives bolt-tight contact, speeds "break", increases switch life.

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For Safety's Sake—Buy Vacu-Break

BULLDOG ELECTRIC PRODUCTS DIVISION
I-T-E CIRCUIT BREAKER COMPANY

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LAMSON *Exidust* CENTRAL VACUUM CLEANING SYSTEM

Protects worker, clears machine, salvages chips — all in one operation.

Modern plants are using *suction* instead of pressure to clear machines. Old-fashioned blowing is costly and unsafe. Operators and other workers are endangered from flying particles. Shop air is fouled unnecessarily. Additional labor is needed to clean-up the mess.

Now, the LAMSON EXIDUST CENTRAL VACUUM CLEANING SYSTEM provides you with the modern solution. It vacuums chips, particles, dirt, dust by means of a flexible hose fitted with proper attachments; drawing them through a stationary piping system to one or more collector-separator tanks. Feeder inlets are conveniently located for complete plant coverage.

By providing clean, safe, flexible ONE-TIME handling, LAMSON EXIDUST SYSTEMS have proven successful in saving users thousands of dollars annually in housekeeping costs alone. Worker safety, better working conditions and longer machinery life due to cleaner parts are also high on the list of intangible benefits resulting from the LAMSON system.

Find out more about EXIDUST. Write today for the "LAMSON EXIDUST SYSTEMS" bulletin. Or, simply clip this advertisement to your letterhead and mail to:

PIONEERS *the Conquest* OF INNER SPACE

LAMSON CORPORATION

603 Lamson Street, Syracuse 1, New York

PLANTS IN SYRACUSE AND SAN FRANCISCO • OFFICES IN ALL PRINCIPAL CITIES

Manufacturers of Airtube® (Pneumatic Tube Systems) • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors® Clinical • Trayveyors® • Food Service Systems • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems

For more facts Circle 529 on Reader Service Card

DON'T WASTE UTILITIES

Begins on page 238

DIRECT MIXING VALVE is used instead of heat exchanger to temper water to specified temperature, thus saving heat.

• **Plug cocks**—Where a fixed flow of water is needed, we install a plug cock near the outlet. Flow adjustment can be set or changed only with a wrench, so it's less tamperable than a hand-wheel valve. We also supply a hand-wheel valve for operator shut-off. This combination assures a set flow since the operator never has to touch the plug cock.

• **Single-seat valves**—In our experience, no double-seat, float-controlled water regulating valve will give a tight shut-off. This invites a big waste of water when it's used to control make-up into ponds, towers, or tanks. Instead, we use a device that senses water depth by air pressure and then pilots a single-seat valve.

GASES, COMPRESSED AIR

• **Interlocking controls** — Our search for savings here has just begun (we tackled other more promising elements first). Already we realize one big deterrent to waste: Turn it off when you're not using it (same rule applies to all other elements). But you can't rely wholly on people for this. So RPD is installing interlocked controls that automatically shut off gas flow when machine isn't running.

• **Engineered reduction**—The results of applied mechanical refrigeration on exothermic atmosphere gas (described on page 242) have shown how an engineering study and a particular utility saving will mean savings in companion utilities. We be-

gan asking these questions: Is the gas being used efficiently? Is it needed at all? Will a cheaper substitute or a different method do as well? In this case, the lower dewpoint made possible by mechanical refrigeration eliminated costly enriching and saved some $10,000 each year in gas costs.

• **Blower drying** — High-volume, high-velocity blowers have been designed to dry steel parts in washers, which usually require heating with gas. Thus, the use of gas has been completely eliminated.

• **Combustion control** — Flue gas from any combustion operation using gas is analyzed according to standard practice for boiler control. We make sure of getting the best gas-air mix—not too much or too little air—for most efficient combustion. An inefficient mix may require adjustment of air inlet, cleaning of burner, a different size orifice, or other modification.

• **Automatic shut-off**—For all machinery using pneumatic equipment, RPD has a standard specification that calls for interconnected shut-off solenoids in the airline. We found men forgot to shut off the air, so it ran all weekend.

• **Maintenance surveillance** — We decided to re-schedule a maintenance journeyman on the last shift before each weekend. He arrives and leaves one hour later than the others. After shutdown, he tours the plant, shutting off all hand-operated utilities on equipment.

• **No-leak campaign**—The idea of eliminating leaks is so obvious that one shrinks from suggesting it. But it needs emphasis. By a continuing PM program RPD has cut air leaks to the equivalent of the air "send-out" from a 150-hp. compressor operating all weekend.

• **Ban on compressed air cooling**—We found air was being used inefficiently for cooling that could be done better and more cheaply by water, blowers, or refrigeration. In one case, compressed air was being blown on a long run of 2-in. hollow tubing to keep it from overheating. This tubing enclosed a run of welded small tubing in its travel from a welder to an annealing furnace. We substituted finned outer tubing and blew low-pressure air on it as generated by a small blower. In another case, a compressed air stream was being used to cool hot die-cast parts on a conveyor line. We made a portable blower similar to a tank-type vacuum cleaner, and ran the hot parts under it. This cools them off just as well.

FINNED TUBING sheds heat, is cooled by a small blower. Formerly, a non-finned tube was cooled with compressed air.

• **Lower air pressure**—One general principle is to reduce air consumption by stepping down the line pressure to what's needed to do the job. For example, we got a 50% cut easily on air used for parts blow-off to remove moisture and for parts ejection. Air regulators in individual lines pay for themselves in a week. A further cut was made by improving the timing of air jets and getting closer cut-off.

• **Proper air pressure**—Most air cylinders on shop equipment are oversized because exact sizes are not obtainable. In such cases the airline pressure can be reduced by a regulator to fit the need of the job.

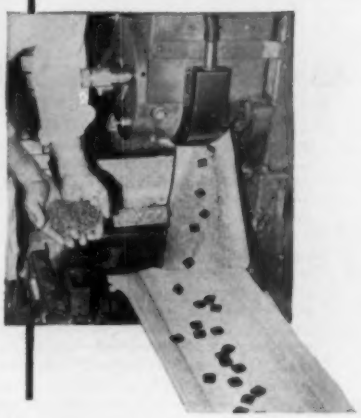
ELECTRIC POWER

• **Power-factor correction**—This is the source of our biggest power savings. Many plants tackle the problem by using capacitors and synchronous motors, or by judicious sizing of induction motors. But RPD gets maximum power factor by controlling the excitation of several synchronous motors used as compressor drives. This is supplemented by capacitors on all bus duct distribution lines (which also increase their carrying capacity).

Turn the page

PIN POINT PRESSURE...

WITH A LAMSON BLOWER



Removes excess candy chips

You get *exactly* the right amount of clean, dry air or gas from the right size LAMSON BLOWER.

That's why LAMSON BLOWERS are specified for a wide range of end-uses—each demanding a continuous volume at a specific pressure from a dependable source.

LAMSON BLOWERS, for instance, calibrate meters for gas companies... provide air cushions to protect freshly printed stock from angle bars on presses... keep coal dust from infiltrating vertical drive shafts of coal pulverizers in power plants... blow excess granulation from tabletting die tables in candy manufacture... power air-float conveyors to allow one man to handle huge loads of bulk pulp in paper mills.

Available in a wide pressure and volume range, fabricated or cast iron, LAMSON BLOWERS can be designed to fit your job requirements.

Why not write today for a bulletin containing full information about LAMSON BLOWERS AND EXHAUSTERS? Or, simply clip this advertisement to your letterhead and mail to:

LAMSON

LAMSON CORPORATION

603 Lamson St., Syracuse 1, N.Y.

PLANTS IN SYRACUSE AND SAN FRANCISCO
OFFICES IN ALL PRINCIPAL CITIES

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NEW SOURCES OF SUPPLY-
WHERE?

ASK THE MAN FROM THE NORTHERN PLAINS

When you need parts, processing, assemblies, we can locate new sources for you. Northern Natural Gas Company, Omaha, Nebr., has catalogued for instant reference by electronic methods, information about the production capacity of thousands of plants in the Northern Plains. This detailed information has been gathered and tabulated by the private gas utilities of the area. Upon receipt of details regarding your requirements, we will be glad to suggest possible qualified suppliers located in the five state Northern Plains Area.

FOR ACCURATE INFORMATION about the Manufacturing Facilities available in the Northern Plains, write Randall Klemme, Vice Pres., Northern Natural Gas Company, Omaha, Nebraska, or call Webster 7600.

Serving the Northern Plains
Northern Natural Gas Company
General Offices: Omaha, Nebraska

This Unique Service Is Yours ... Simply For The Asking

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GUARANTEED

to give drip-tight leak-proof seal

greates[illegible] in unions

DART

For over 55 years the firm guarantee back of each and every DART UNION sold has been — *"if one should leak through we will give you two"!* The record reveals that less than 1 in every 100,000 has proven to be faulty. The extra wide bronze to bronze seats, precision ground to a true ball joint, mounted in heavy malleable iron pipe ends and protected by an extra heavy union nut, make a drip-tight, leak-proof connection WITHOUT EXCESSIVE WRENCHING time and time again.

Guarantee positive tight connections and extra long service on your pipe lines by using the DART GUARANTEED UNION.

Yours on request: Descriptive brochure on Dart Unions and Union Fittings.

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GENERAL SALES AGENT

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BRANCHES: NEW YORK 3
PITTSBURGH 22 • BOSTON 10 • ROME, GEORGIA

DON'T WASTE UTILITIES

Begins on page 238

• **Motor check-up**—Every motor, 100-hp. or over, gets reviewed for load demands to see whether it's suitably engineered, and whether individual power-factor correction is justified. We try to apply motors for operation at full load—the tendency to overdesign horsepower results in poor power factor when running partially loaded.

• **Voltage regulation**—We can get significant savings by a periodic check of voltage conditions. Our distribution voltages can be adjusted to their best settings by changing the voltage taps on substation transformers. If you run too high in voltage, you pay for it in reduced equipment life. Occasional adjustments are required by major alterations in plant loading. Particularly if plant voltage is above rating, downward readjustment saves power several ways: It decreases motor starting current and running kw., also raises power factor (over-voltage causes poor power factor). By reducing feeder voltages 2.4%, we have increased the life of our incandescents, solenoids, and similar equipment by 25%.

• **Rate studies**—We found that detailed studies of utility rates can result in significant savings. Plant operations can usually be coordinated to comply more advantageously with the rate structure. Generally, it is wise to:

1. Purchase every required load through one meter in order to utilize the low end of the rate to the greatest extent.

2. Adjust loading equally throughout all shifts where possible to decrease peak demand charges.

3. Avoid repeated starting of large equipment because of the effect upon demand. It can be more economical to continue running rather than to make repeated starts.

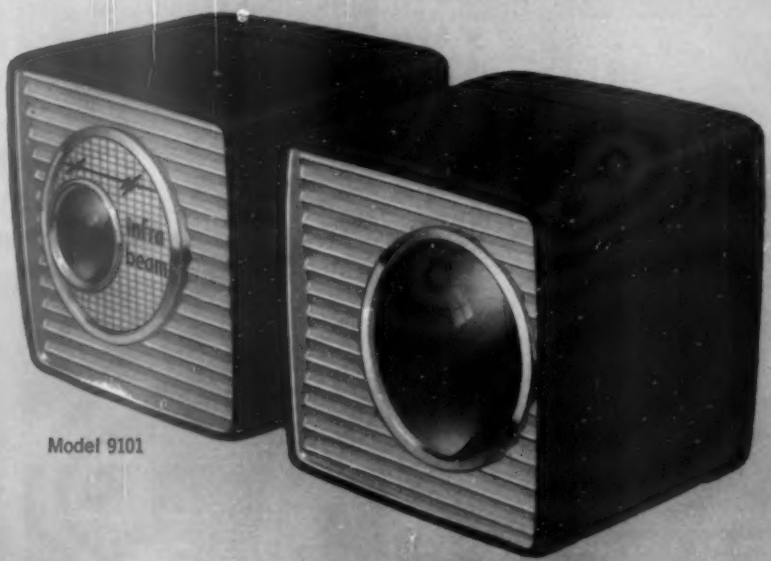
4. Purchase power at the primary rate and reduce voltages in users' substations.

• **Lighting controls**—We have cut power consumption by replacing manual lighting controls with timers, clocks, and photo-electric controls so that power is now used only when needed. This policy also extends fixture bulb life.

Turn the page

For more facts Circle 532 on Reader Service Card

Announcing
Infrabeam
... the revolutionary photoelectric control using modulated infrared radiation



Model 9101

FOR THE FIRST TIME, photoelectric control is *simple, reliable,* and *practical* over an extremely wide range of applications.

Infrabeam is a totally new type of photoelectric control . . . developed and tested over a period of more than a year, now ready to go to work in your plant or as part of equipment you manufacture. It offers a combination of simplicity, sensitiveness and reliability that has never before been achieved.

New infrared detectors, perfected for missile guidance, are in many ways superior to photocells that respond to visible or ultraviolet light. In Infrabeam, the Receiver contains a similar infrared detector which is screened against visible light by a simple optical filter. Further, the infrared beam from the Projector is "modulated" — brightening and dimming at a frequency of 400 cycles per second. The Receiver is electronically tuned to this frequency, so that the control will not respond unless it gets a signal from the associated Projector.

WHAT THIS MEANS TO YOU . . .

Compared with standard "general purpose" photoelectric controls, Infrabeam provides far greater sensitiveness in countless applications at close or moderate range. At extreme range — as much as 1000 feet — it offers superior reliability and freedom from interference. Because it operates equally well by reflecting the infrared beam from a detected object and into the Receiver, it is the *only* photoelectric control able to reach into "blind" areas with perfect freedom of installation.

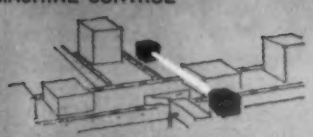
Projector and Receiver are attractively housed in anodized cast aluminum. The quick-detach hinge allows easy separation for use as opposed units, or accurate angling for use in reflection. Physical mounting and electrical connections are simplicity itself, and permit quick replacement of either unit without disturbing permanent wiring.

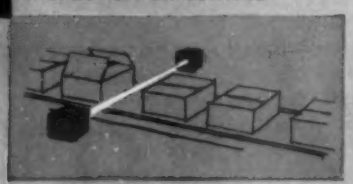
Find out how simple and practical photoelectric control can be for *you.* WRITE TODAY FOR COMPLETE DETAILS AND SPECIFICATIONS.

LONG-RANGE DETECTION

MACHINE CONTROL

LIQUID LEVEL CONTROL


INSPECTION OR SORTING


CONVEYOR CONTROL

ELECTRONICS DIVISION

CRAMER CONTROLS

CORPORATION

CENTERBROOK, CONNECTICUT

For more facts Circle 533 on Reader Service Card

Are you paying $5000 to $15,000 A YEAR TOO MUCH for this operation?

If you regularly address 5 or more cartons per shipment, you might be shocked to find out how much it is costing you to address your multiple shipments with antequated, repetitive methods.

The modern STEN-C-LABL* Systems PROVIDE A TWO-WAY SAVING

1 As a by-product of office procedure
Your present method of preparing your invoices, orders, bills of lading or shipping papers can also prepare STEN-C-LABLS *at the same time.* Whether you use manual or electric typewriters, electric billing or accounting machines, slave machines or various magnetic tape and punched IDP systems, there's a STEN-C-LABL to fit your requirements.

2 By making unlimited impressions direct to cartons, labels or tags
With handy squeeze-feed applicator, shipping department makes unlimited impressions direct to PANL-LABL printed on carton at no extra cost. Also addresses gummed labels and tags. Addressing is fast, neat, legible.

DURABLY MARKED AND PLAINLY LEGIBLE at handling distance. A STEN-C-LABL address is sunproof and waterproof—becomes permanent part of carton. Reproduction is sharp and easy to read at handling distance.

FREE BROCHURE gives full details.
MAIL COUPON TODAY!

STEN•C•LABL, INC.
F-6, 1821 University Ave., St. Paul 4, Minn.
Yes, I'd like to know more about saving with STEN-C-LABLS.

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COMPANY_____

ADDRESS_____

CITY_____ STATE_____

*Registered U.S. Pat. Off. The term STEN-C-LABL is the trademark and exclusive property of STEN-C-LABL, Inc. All STEN-C-LABLS are manufactured by STEN-C-LABL, Inc., St. Paul, Minnesota under, U.S. Patent No. 2,771,026. Other patents pending.
Also available in Canada.

DON'T WASTE UTILITIES

Begins on page 238

GAS CHILLER (mechanical refrigeration) eliminated need for expensive gas additive, saved some $10,000 a year.

• **Stray current losses**—We found that by being continually alert and correcting grounds in plating and other equipment we could eliminate stray currents, thus save lost energy. This field is often overlooked until there's major trouble. And it can often cost more than allowing water to run down a hole.

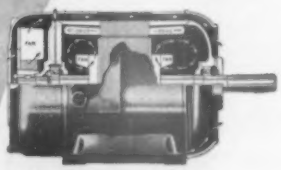
HOW TO CUT UTILITY COSTS

What you have just read on cost-cutting improvements wasn't the result of a casual or "hit-or-miss" approach. Key to getting results of this caliber is an organized and continuing program. This is no "one-shot" deal. Many people think of utility conservation only as a single plant round-up concentrated on plugging leaks and eliminating self-evident waste. That's just the beginning. A hard-hitting program calls for constant effort and follow-up, supported by a study of the usages of all utilities and a search for ways to tone down or even eliminate every outlet. It calls for an aggressive group, always alert for opportunities to save.

Take, for example, the preparation of the annual utilities budget. Ordinarily, a plant engineer is satisfied to use last year's figures as a base on which to add or subtract costs of all utilities he expects to add or remove. A conservation-minded man goes further. He scans the budget for ways to reduce consumption, cut costs. He doesn't just connect up utilities to a machine or

FOR PROVEN ECONOMICAL POWER

AIR COOLED **Custom Built . . . NOT Custom Priced**



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BALL BEARING MOTOR

Here's real power, custom built to fit your every requirement. Totally enclosed — fan cooled — polyphase 50 or 60 cycles — constant speed — squirrel cage induction — high torque — low starting current — enclosed ball bearing.
Send for complete details Today.

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ELECTRIC CORPORATION
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FIRST CHOICE FOR PUMPS, VALVES and MIXERS..

PALMETTO®
Braided Asbestos Packing

Five braid over braid style numbers to choose from for reciprocating rods and plungers, slow rotary motion, shallow stuffing boxes, and valve stems.

Get up-to-the-minute data in the Palmetto Self-Lubricating Packings Catalog and Price List. Ask for SLP-659R.

GREENE, TWEED & CO.
NORTH WALES, PA.

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Just 24 minutes with this movie can save hundreds of man-hours in your plant

If you're concerned with cost control, don't miss Texaco's movie about grease, called "Shear Magic."

There's no hard sell in "Shear Magic." It's devoted entirely to helpful information on ways to cut the cost of maintenance and prevent unscheduled downtime.

A well-planned grease schedule can extend equipment life and cut repair costs and you can bring this message home to your maintenance men by having them see "Shear Magic." This movie suggests ideas for planning the grease schedule that best fits your operation. And it reminds the men that properly choosing and applying greases helps their company, because it assures tighter control of maintenance costs.

A Texaco Lubrication Engineer will be glad to arrange a showing of this full-color film in your plant. Or, if you wish, send for the informative Texaco booklet called *A Grease Schedule for Cost Control.* For quick action, mail the coupon today.

TEXACO

Texaco Inc.
Dept. F-G-32
135 East 42nd Street
New York 17, N. Y.

☐ Please send me more information about a free showing of "Shear Magic" to my organization.

☐ Please send me a copy of *A Grease Schedule for Cost Control.*

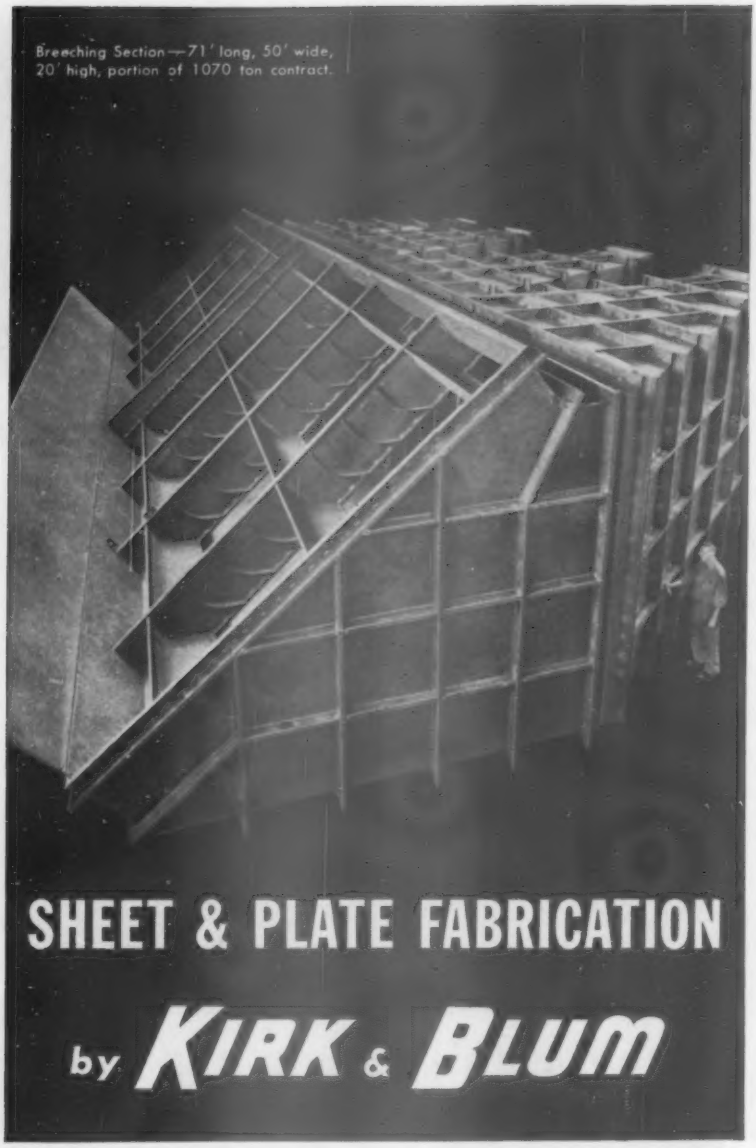
Name_____

Company_____

Address_____

City_____ State_____

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL



Why can Kirk & Blum save you time and money on huge fabrications? Extensive facilities and equipment of a 170,000 sq. ft. plant enable experienced K & B craftsmen to utilize their production ingenuity to the fullest.

Heavy assemblies, up to ½" thickness are produced, pre-assembled and loaded for shipping in a 50' x 480' bay with overhead handling capacity up to 25 tons.

Send prints for prompt quotation or write for your copy of new K&B Sheet and Plate Fabrication Catalog.

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DON'T WASTE UTILITIES

Begins on page 238

process according to the ratings the book says it needs. He questions the very existence and size of the needs. This attitude is basic to obtaining best results.

There's another basic element. Somebody must be responsible for the conservation program. What is left to "anybody" and "everybody" ends up being nobody's job. You can bank on it, little or nothing will be achieved. Easiest way to solve this kind of problem is to put one man on the payroll with this sole responsibility. In a large plant he'll more than pay for his keep—but higher management usually balks at the expense when it has only projected savings in view. In a small plant—with a slimmer profit margin—the cost looms even larger.

• **Committee approach**—The answer at RPD—and it may be yours—was the establishment of a conservation committee. It has several advantages. All our committee men are experts in their field of plant maintenance and engineering. This increases committee effectiveness. Furthermore, a committee automatically gets more people committed to action. Each member becomes a salesman for the project. Finally, follow-up is more efficient.

How does RPD arrive at its goals? The method varies with the utility. In general, each program is directed by the main committee. It evaluates each proposal and decides if it is reasonably attainable. The existence of an aggressive spirit, good cooperation, and proper timing influences achievability. We limit ourselves to one-year goals that combine what's possible with what we'd like. No pie-in-the-sky visions for us—an unrealistic goal is discouraging.

One of the interesting sidelights of the conservation program has been the chain-reaction benefits from certain savings, particularly on process equipment. For example, by electrically tying in a washer-drier with the conveyor serving it (to save power), we found we could also save water, air, and gas whenever the conveyor is inoperative. This sort of thing underlines the inter-relationship of utilities.

How often does RPD's committee

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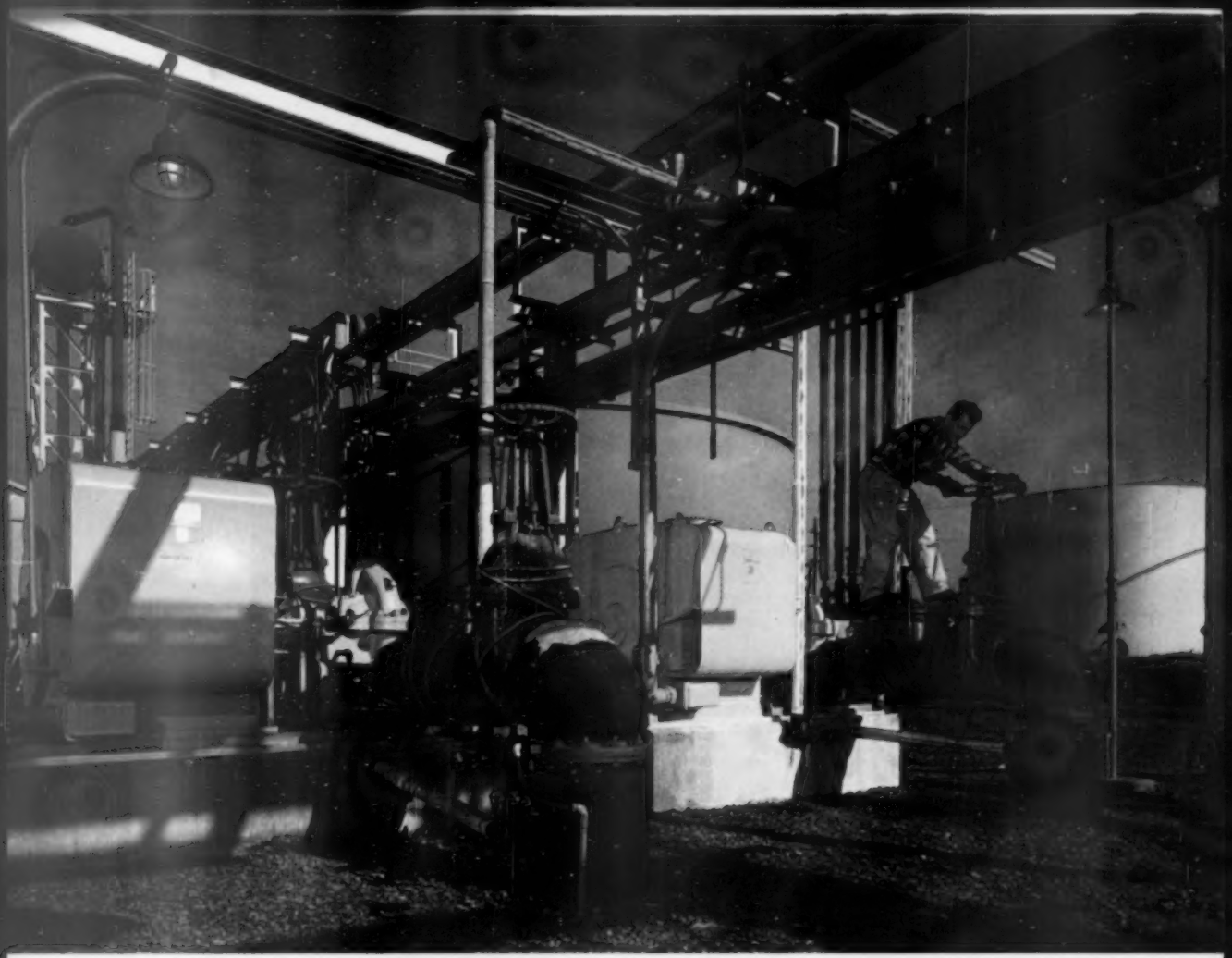
For more facts Circle 539 on Reader Service Card ➤



CONTROL CORROSION

Severe weathering, critical chemical exposures even at elevated temperatures, and many other corrosion problems can be controlled by a Truscon system specifically engineered for the job. Maximum protection at the lowest cost per square foot per year is the prime consideration of every Truscon recommendation.

When you consult Truscon you get a written specification for proper surface preparation and painting, plus assistance in application and inspection methods. Interior or exterior surfaces, metal or concrete, machinery, buildings, bridges, or tanks, can all be protected by a Truscon coating system. Call the branch nearest you or write Truscon Laboratories for specific information.

TRUSCON *Laboratories*

Industrial Maintenance Division of
Devoe & Raynolds Co., Inc.
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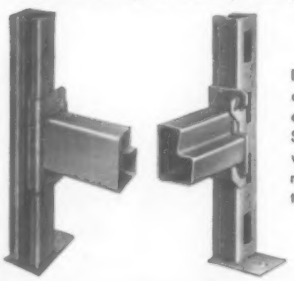
American

Slide-n-Lock adjustable STORAGE RACKS

no storage rack but American offers all these features

1. **American Stringers are one-piece**—made of durable, continuous welded steel tubing, made from high carbon steel.
2. **American Stringers have step construction** for fast, simple conversion to decking—step is 1⅝" deep—thickness of finished 2" lumber.
3. **American Posts are rugged**—made from extra heavy gage steel—roll formed by special tooling.
4. **American has positive double-wedging lock**—safe-t-pin gives positive security against unhooking stringers.
5. **American has smooth, aisle-side construction**—no protrusions of any kind to tear clothes or create a safety hazard.
6. **American has higher safety factors**—2.25 to 1—for greater protection to truck operators and merchandise.
7. **American Racks are easy to erect**—no costly bolting—all parts hook into place.
8. **American Racks are easy to adjust**—all stringers can be moved independently of any other part.
9. **American Upright Frames are cross braced** against sway—turnbuckles provide ready take-up for uneven floors.



10

Left—smooth line construction of aisle side of post and stringer eliminates hazardous protrusions. Stringers raise and lower like a window. Right—note rigid connection when stringer is "locked" to post.

send for catalog

American Slide-n-Lock storage rack installation, Henry Holt & Company, Clifton, New Jersey

AMERICAN METAL PRODUCTS COMPANY

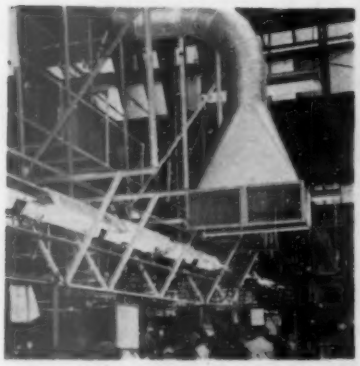
STORAGE RACK DIVISION

5965 Linsdale Ave. amp® **Detroit 4, Michigan**

Manufactured in Canada by Sunshine-Waterloo Co., Ltd., Waterloo, Ontario

DON'T WASTE UTILITIES

Begins on page 238



BALANCED AIR make-up system eliminates cold-air leakage from outside the plant, makes heating easier and less costly.

check its progress? We chart statistics monthly, but we check progress only on year-end figures. We find month-to-month variations are really not significant. It's only when you see a consistent tapering off in demand that you can be sure you've hit pay dirt.

• **Training supplement**—Providing equipment for cutting utility costs is of little value unless it is properly operated and maintained. This requires adequate training of both operators and service people. Without this, it's appalling how the intent of original design or instruction is misinterpreted as it passes down each level of supervision. We feel it's important for each man with a screwdriver in his pocket to really know the equipment he works on, its operating principles, its adjustments and capacities, and how to troubleshoot it.

At RPD, operating instructions and a schematic diagram of the system are posted (under framed glass) at every machine or process. Thus, in our three-shift operations, the "guide book" is always available to operators or maintenance men. We train our maintenance men in servicing all special equipment. Men are taught the basic principles of our water reclamation, and the design concepts of our engineers. Others take refresher courses in power distribution. Sometimes new skills are needed. Electricians, for example, can take a year-long course to qualify them for electronics.

Turn the page

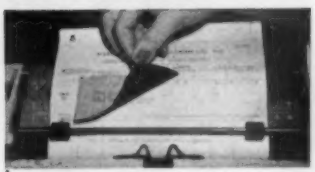
Just "touch" the carton and there's your label

Weber Touch-Stenciling—the fast easy way to address multiple carton shipments...

No more stencilboards, rubber stamps or label typing. Instead, you can print facsimile labels directly on cartons with just a "touch" of a Web-O-Print hand duplicator.

Stencils are pre-cut to duplicate your label. Customer's name and address or product information is filled in on a typewriter or by hand. Then slip the stencil on the handy duplicator and touch-stencil all the cartons in the shipment. The duplicator leaves a clean, sharp print that will not fade, rub or wash off.

It's so easy to do. With a smooth, one-hand motion 40 to 50 cartons can be addressed in a minute. The duplicator holds enough ink for several thousand impressions and it prints anywhere — cardboard, wood, paper, smooth or rough, round or flat surfaces. After the shipment has been addressed the stencil is thrown away, saving filing time and space.



FAST, EASY. Stencils are pre-cut to your specifications. Type or handwrite in the variable data and slip on duplicator. Takes just seconds to change stencils for each order.

Send for free bulletin on Weber "Touch-Stenciling" methods. Packed with ideas on addressing and marking multiple shipments.

Weber
MARKING SYSTEMS
Sales and Service in all principal cities

WEBER MARKING SYSTEMS, INC.
Dept. 17-F
Weber Industrial Park,
Mount Prospect, Illinois

Send me your bulletin on "Touch-Stenciling" methods.

Company_____
Individual_____
Position_____
Address_____
City_____ Zone_____ State_____

For more facts Circle 541 on Reader Service Card

BUCKEYE

air-powered routers make deeper, heavier, faster cuts!

Series 61

Series 31

Now Buckeye offers two new series of compact, air-powered routers which can make deeper, heavier, faster cuts than larger electrical routers of greater horsepower. For example, Buckeye Series 61 Router cuts through 2" oak in one pass, using ½" dia. bit! Straight or intricate contour cuts can be made with speed and precision in non-ferrous metals such as aluminum and magnesium alloys, bronze, brass, stainless steels, all woods, plastic, and even honeycomb!

Both Series 61 and Series 31 feature dependable Buckeye air motor which will not burn out, even if tool stalls . . . lightweight, easily maneuvered base . . . positive-locking depth-of-cut adjustment. Available as portable units complete with base, or power unit only for fixture mounting.

Series 31
—Aircraft Model

SPECIFICATIONS	SERIES 31	SERIES 31 Aircraft Model	SERIES 61
CAPACITY: COLLET	1/8" to 1/4"	1/8" to 1/4"	1/4" to 1/2"
SPEED RPM	20,000	20,000	6,000 to 15,000
OPERATION-THROTTLE	Lock Button	Lever/Lock Button	Thumb Flip
WEIGHT—Power Unit Only	3¾ Lbs.	2 lbs.	9½ Lbs.
Power Unit with Base	4¾ Lbs.	3 Lbs.	12 Lbs.
HEIGHT—Power Unit Only	6¾"	6⅞"	9¾"
Power Unit with Base	7"	7⅛"	10"
HOSE I.D. RECOMMENDED	1/4"	1/4"	3/8"

write today for informative literature and prices!

Buckeye Tools CORPORATION

P.O. BOX 966, DAYTON 1, OHIO

Pioneering Power Tools for Industry Since 1920

DON'T WASTE UTILITIES

Begins on page 238

• **Preventive maintenance**—Knowing how to maintain conservation equipment isn't enough. Take a control such as an automatic make-up valve. You have to maintain it, calibrate it, adjust it as necessary to make sure it fulfills your intent. We do this through a program of scheduled maintenance to check operating conditions. We don't believe in having inspectors check equipment and report defects for later repair. We put a trained maintenance man on the job, and set up the detection of any malfunction so he can easily tell from visual or recorded data (such as maximum temperature or minimum pressure) whether the equipment is doing what it should. If it isn't, he can make adjustments right away—no wasteful paperwork.

There's always the problem of limiting these PM activities to necessary duties, and avoiding needless check-ups. It's a matter of delicate balance between analysis of theoretical requirements and practical experience. We often ask our journeymen for opinions on frequency of adjustments and calibrations. (You might be surprised at how much these guys know!) Then our foremen review them and recommend schedules. Our maintenance engineers prepare instructions and set the schedules, subject to approval by the maintenance committee.

Remember, too, that frequent follow-up in line with this careful scheduling is necessary. For example, we schedule a monthly adjustment of all flush valves on toilet bowls. It pays. Some valves get to run like Niagara Falls. Here's another: A journeyman has a definite schedule for checking valve bonnet leaks, and repacking stems where necessary. This, too, pays off.

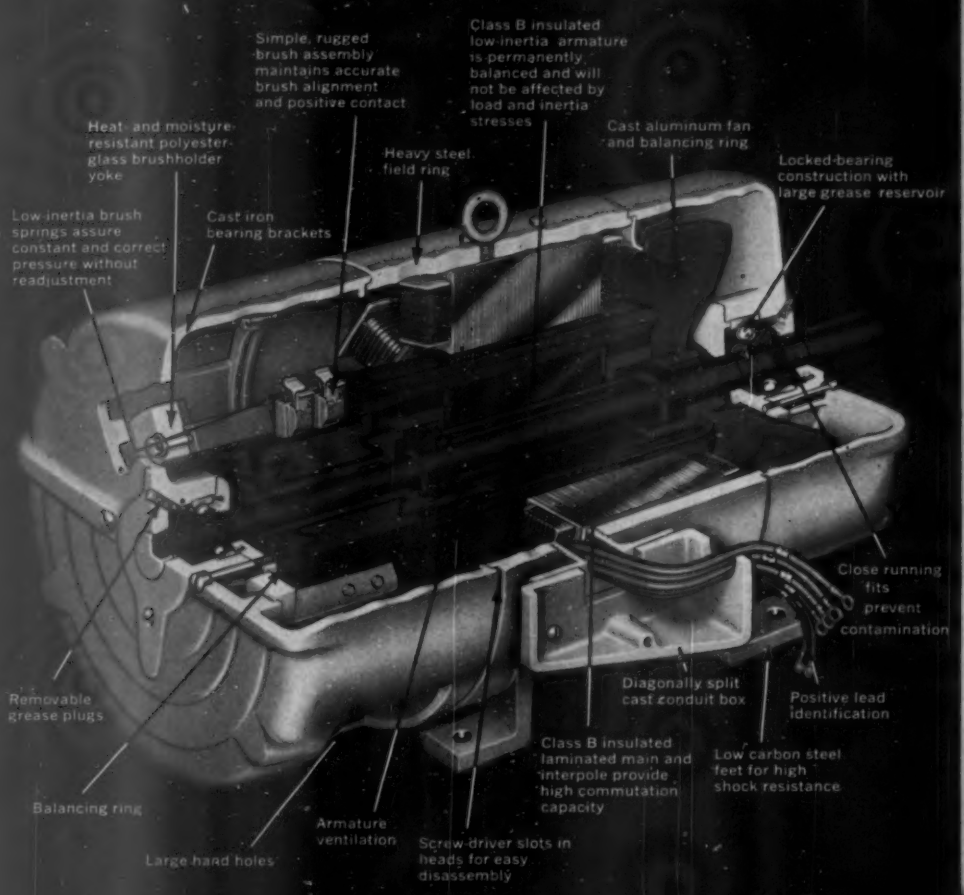
Yet we don't rely wholly on schedules and follow-up. In some operations a permanent watchman is on the job in the form of a malfunction alarm or control that signals excess flow or shuts off flow until a proper adjustment is made.

By now you must have discovered what we mean by a continuing and organized conservation program. It employs people, methods, schedules, and equipment to swing it successfully. **END**

For more facts Circle 542 on Reader Service Card

For more facts Circle 543 on Reader Service Card

Here's the latest in D-C motor design:


Simple, rugged brush assembly maintains accurate brush alignment and positive contact
Class B insulated low-inertia armature is permanently balanced and will not be affected by load and inertia stresses
Heat- and moisture-resistant polyester-glass brushholder yoke
Heavy steel field ring
Cast aluminum fan and balancing ring
Locked-bearing construction with large grease reservoir
Low-inertia brush springs assure constant and correct pressure without readjustment
Cast iron bearing brackets
Close running fits prevent contamination
Removable grease plugs
Diagonally split cast conduit box
Positive lead identification
Class B insulated laminated main and interpole provide high commutation capacity
Low carbon steel feet for high shock resistance
Balancing ring
Armature ventilation
Large hand holes
Screw-driver slots in heads for easy disassembly

...and some easy-to-add field modifications

A-c tachometer for speed indication

A-c motor-driven blower with permanent dry-type filter for easy mounting on bearing bracket

Magnetic disc-type brake with d-c series or shunt, or a-c coils

Helical single, double, and triple reduction gear units for all ratios

New Louis Allis FLEXITORQ® D-C MOTORS

...offer you vastly improved commutation–low brush wear–400% short-time overload capacity–and unmatched flexibility!

Bear this in mind: The Flexitorq is *not* just another *rerated* d-c motor. It's *all new*—and it's been designed to give you more for your power dollar — in superior performance, matchless field flexibility, and unrivalled economy of operation and upkeep.

Advanced armature design and brush construction offers improved commutation, faster response, and lower brush wear. Class B insulation system provides exceptional thermal endurance... is rated for 60°C rise for continuous duty... and creates a barrier to moisture, acids, alkalis, and other contamination.

The net result to you is reliable, trouble-free power for constant and adjustable speed drives. For example, Flexitorq gives you 400% faster acceleration, plus much better deceleration, reversing, and speed changing. You can safely impose 400% intermittent and 15% continuous overloads — and the high-torque design is a welcome plus when you need extra power for hard-to-start machines.

The new Louis Allis Flexitorq is lighter and more compact than previous d-c motors... lets you squeeze more power into less space... yet is actually *easier* to service! Brushes and entire brush-holder assemblies can be quickly inspected and removed without major disassembly. And since brush springs remain conveniently attached to the brush holders, brush changing is a simple affair.

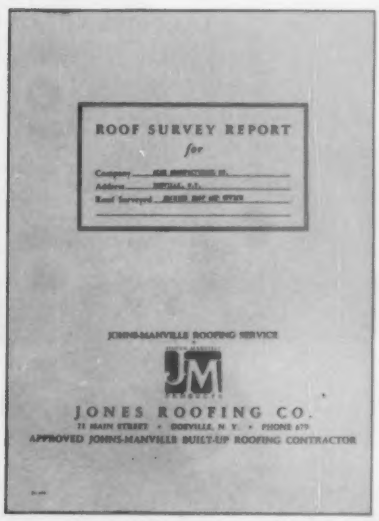
Flexitorq d-c motors are available in sizes from 1 to 400 hp — in various enclosures. See your nearby Louis Allis District Office for information and application help. Or write for Bulletins 3150 and 3200 to The Louis Allis Co., 432 E. Stewart St., Milwaukee 1, Wis.

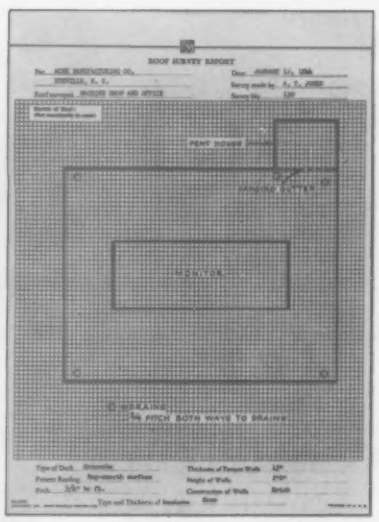
LOUIS ALLIS

DC-217

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

Let trained eyes give you this money-saving roof report





When you call in your approved Johns-Manville Contractor, it costs you nothing for a detailed written report on the state of your roof. That's right—*nothing!* His trained eyes are quick to spot present troubles and quick to see where trouble is sure to come. And he knows how to cure roof ills that might cost you thousands of dollars.

Take advantage of this exclusive Johns-Manville Roof Survey plan today. Call in your approved J-M Roofing Contractor. Find out what your roof needs are or will be—and how he can cure them with quality Johns-Manville Roofing Products. He is listed in the Yellow Pages under "Roofers," or write to Johns-Manville, Box 158, Dept. FA-6, 22 East 40th Street, New York 16, New York.

JOHNS-MANVILLE

J-M 7★ 7-STAR VALUE PRODUCTS

For more facts Circle 544 on Reader Service Card

AUTOMATIC MARKING SAVES MONEY

New ROLACODER marker imprints brand names, contents, codes and lot numbers on your shipping cases

Saves on container printing costs... eliminates hand-stamping... insures faster identification

- Low-cost . . . pays for itself in months
- Compact . . . works by friction . . . requires no troublesome adjustments
- Install it yourself on any conveyor, case-sealer, etc. to mark from side or top
- Not a gadget — beautifully designed and precision-made to give consistently dependable performance, uniform impressions
- Patented type base holds type and dies securely, makes copy changing easy
- Spots imprints accurately in any desired location
- Many thousands in use

Models to suit every need . . . including twin-action units for marking 2 or 4 sides of cases simultaneously.

Write today for Bulletin "ROL-3"

First and foremost in automatic production-line CODING, MARKING and IMPRINTING machines — Gottscho®

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CUT CLEAN WITH CLEAN-CUT!

Clean-Cut 72 Mows at 8 MPH

Cut Grounds Mowing Time in Half!

Get a clean, even mowing job from Clean-Cut's "floating" mower units. Mowers are so maneuverable you make 90 or 180-degree turns at top speed — within the length of the Tractor.

Three riding mowers available — the Clean-Cut 72, 36 and 24 — A Clean-Cut Mower to fit *your* needs!

Clean-Cut 24 or 36

Free Literature — Demonstration!

Write today for colorful FREE "Mowing Magic" folder giving full details about Clean-Cut Mowers. Ask about a FREE Demonstration.

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For more facts Circle 546 on Reader Service Card

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by STOP-FIRE Inc., *New Brunswick, N.J.*

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for full information Specify Brochure F-12

Distributed in Canada by Lavitt Safety, Ltd., Toronto

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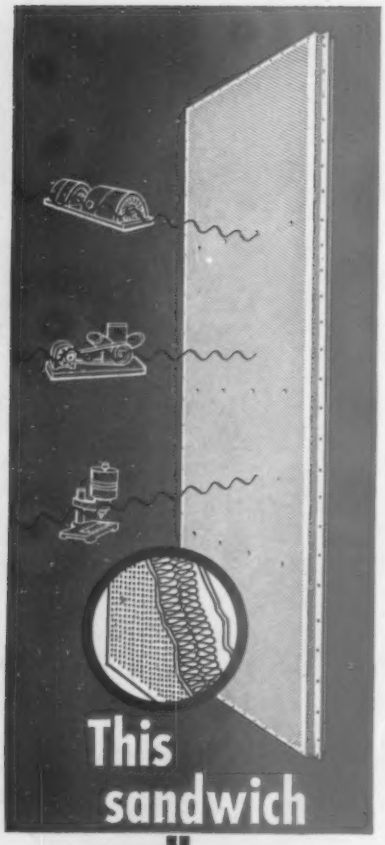

swallows noise

This is an Eckoustic Panel — a very special sandwich, made of two layers of steel wrapped around a blanket of Fiberglas.

You can use it as a modular building block to build a soundproof room or plant office — a machinery enclosure — a production test facility — or, for that matter, practically anything where you must shut noise out, or seal it in.

Eckoustic panels protect employees from the harmful effects of exposure to continual noise . . . increase employee efficiency by creating more comfortable working conditions. And we have the results of acoustical studies which show they do it more effectively than other types of acoustical panels.

We also have a free folder that tells how Eckoustic Panels can help you solve sound control problems faster and more economically than you may have thought possible.

Let us send you the complete information without obligation.

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FACTORY CATALOG NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.

AUXILIARY

1—Air Compressors. Bulletin No. 94, "Economical Air for Industrial Needs," describes compressors that range from 100 to 400 hp., with ratings in 1-, 2-, and 3-stage units. Gives details of component parts. *The Cooper-Bessemer Corp.*

2—Two-Cycle Gas Engine. Compact, high horsepower driver for centrifugal pipeline compressors, generators, and liquid pumps is introduced in a four-color, 28-page bulletin (No. 176). Design and operating features. *Clark Bros. Co.*

3—Furnaces. Here's a 6-page fold-out booklet (No. 9494) that describes furnace equipment for heat processing. Furnaces come as complete units—pretested, piped, and wired. Lists various applications; includes many photographs. *Sunbeam Equipment Corp.*

4—Heat-Distribution Equipment. Condensed 12-page catalog covers wall-hung and baseboard heat-distribution equipment, tells about new models for high-temperature water applications. Tables of sizes, ratings. *Shaw-Perkins Mfg. Co.*

5—Dust Filter. Bulletin G-30 (8 pages) describes how new "RJ" filter with only three moving parts recovers dust from air-streams loaded with fine, coarse, abrasive or non-abrasive dusts. Installation details. *The Day Sales Co.*

6—Filters. All-stainless-steel filters and filter elements are presented in this 4-pager (M-213A). Describes high-pressure and other specialized filters; lists stock and non-stock products. Flow rates and porosity grades. *Pall Corp.*

7—Air Conditioners. Single- and multi-zone packaged air conditioners are featured in Bulletin 8625 (4 pages). Units come in 25-, 30-, and 40-ton sizes, capacities to 17,100 cfm. Photos, drawings. *American-Standard Industrial Div.*

8—Motors. Two 4-page bulletins: No. MU-244, "Prime Partners," describes drip-proof and totally enclosed polyphase squirrel-cage motors. No. MU-245 lists motors with resilient mountings, 1/6 to 10 hp. *Wagner Electric Corp.*

9—Glass Bag Filters. This 12-pager (No. 806) is titled "Special Report: Freedom from Hot, Corrosive Dust with Glass Bag Filters." Application data show how to solve difficult air pollution problems. *Dracco Div. of Fuller Co.*

MECHANICAL

10—Helicon Gears. Catalog AD-68 (8 pages) describes new gearing system and its relation to other types of face-gearing. Gears are for light to medium loaded applications in from 3:1 to 400:1 ratio range. *Illinois Tool Works.*

11—Clutches. Four basic series of general-purpose clutches for indexing, backstopping and over-running applications are discussed in condensed catalog (4 pages). Torque capacities from 50 lb.in. to 136,500 lb.ft. *Formsprag Co.*

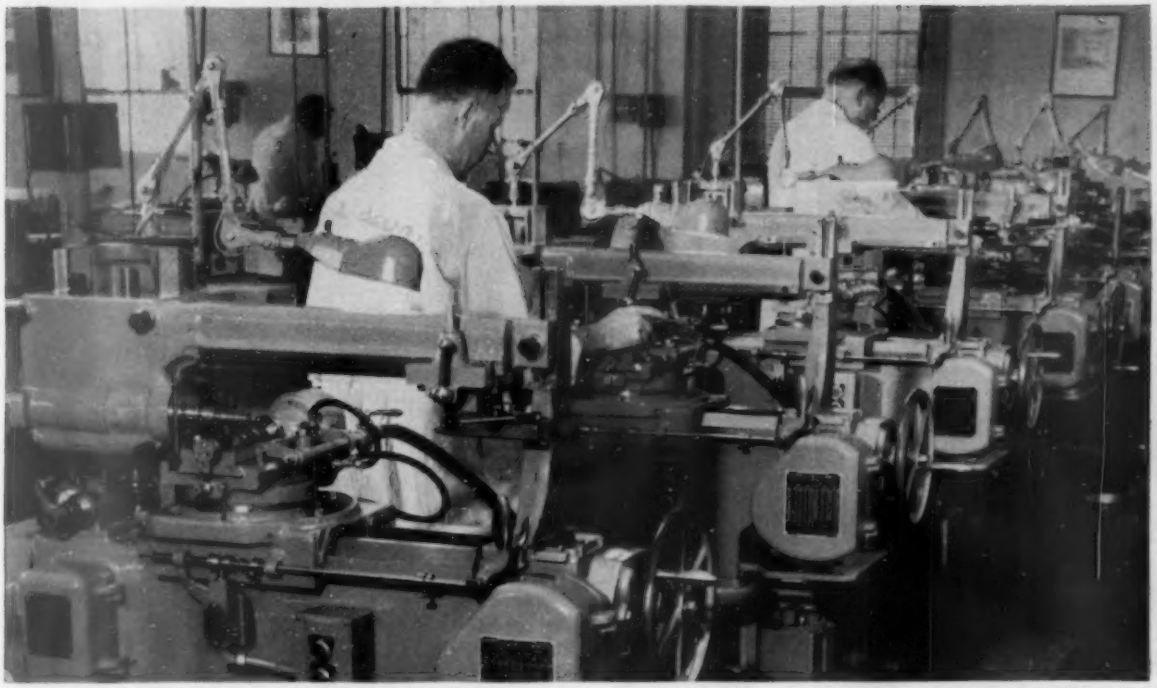
12—Sheaves. Spring-loaded and manually controlled variable pitch sheaves are described and illustrated in Catalog SL-101-A. Its 8 pages cover adjustable motor bases, specifications, tables of stock drive combinations. *Browning Mfg. Co.*

13—Ball Bearings. Advantages of new high-precision radial ball bearings are given in Catalog 60 (8 pages). Lists materials, tolerances, internal clearances, load ratings. Lubrication table, diagrams, photos. *Split Ballbearing.*

14—Instrument Bearings. Bulletin 6002 (4 pages) gives application and similar details on high-precision thin-width bearings for use in synchros, gear trains, potentiometers, servos, small motors. *Miniature Precision Bearings, Inc.*

Turn the page

Better products, *faster,* from your National Seal distributor:



Don't take bearing protection for granted... install new National Oil Seals regularly!

Scheduled replacements with these low-cost seals can pay big dividends in low maintenance costs

Most shops have discovered the money-saving advantages in replacing old oil seals with new National Seals at regularly scheduled intervals to protect precision machines. National Seals hold in lubrication. They seal out abrasive grit and corrosive elements which damage bearings. *Micro-Torc* leather and *Syntech* synthetic, National exclusives, offer unlimited protection for all applications.

Your National Seal Distributor will gladly work with your organization in setting up a compact working stock. Call him for particulars.

NATIONAL OIL SEALS

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DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

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Whether you're building heavy machinery, steel mills, railroad cars, construction equipment or other capital equipment . . . we can save you time, money and production problems with *tailored customer service:*

- **tailored** to industry standards or your own specifications . . . impact-form'd heavy duty nuts and bolts
- **tailored** product verification . . . every heat verified in our own laboratories
- **tailored** design recommendations . . . to your application requirements
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Start now to take advantage of all these services . . . there's no extra cost to you. VMA 6995

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DIVISIONS: *Pittsburgh Gary · Southington Hardware American Equipment*

America's Most Complete Line of Industrial Fasteners

FACTORY / CATALOG NEWS

Begins on page 258

For more about these items, circle item numbers on Reader Service Card next to back cover.

ELECTRICAL

15—Transformers. This colorful 4-pager (No. 139) covers company's transformers, including ventilated dry-type, power (mineral oil and askarel immersed), inert gas-sealed, ventilated dry-type, and others. *Niagara Transformer Corp.*

16—Relay Testers. Bulletin SB-RT-1, "Multi-Amp Universal Portable Test Units for Protective Relays," has 48 pages on new JR and SR series of units in capacities of 0.4, 1, and 2 kva. Tables, charts. *Multi-Amp Electronic Corp.*

17—Distribution Equipment. This 84-page "Buy Log" (GEC-1100B) has detailed information about products of G-E's distribution assemblies and the circuit protective devices departments. Selector charts, photos. *General Electric Co.*

18—Commutator Motors. Mechanical and electrical designs and examples illustrate the scope of variable-speed, three-phase motors in Bulletin 7315Ea (36 pages). Diagram pictures main components of motors. *ASEA Electric Inc.*

19—Pilot Lights. This 24-page Digest (Form L-161B) gives technical data for pilot light assemblies and the lamps for which they were designed. Has information on voltage, mounting, insulation, lens, lens holders, etc. *Dialight Corp.*

20—Insulated Cable. Catalog S-2-60 (16 pages) discusses safety mineral insulated cable and its uses. Gives construction and performance characteristics, fabrication details, wiring dimensions for five conductors. *General Cable Corp.*

21—Transmission Equipment. Here's a whopper of a catalog titled "Easy Estimator." Its 300 pages describe transmission and distribution equipment, give specifications for each product. *Continental Electric Equipment Co.*

Turn the page

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Circle 551 on Reader Service Card

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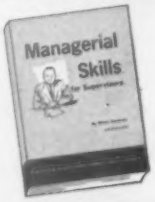
MANAGERIAL SKILLS for Supervisors by Glenn Gardiner and Associates

Compare your best supervisor with your most ineffective. What distinguishes the result-getter from the "also ran"? Managerial skill spells the difference!

This new book shares with supervisors the practical managerial skill techniques which have accounted for the personal success of outstanding executives throughout business and industry.

Concise, easy-to-read language, usefully cross-indexed for ready reference. Profusely illustrated. Twelve action-producing chapters on Skills:



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Belmont Leather Packings meet the requirements of all makes of hydraulic and pneumatic equipment. For example, V-Packings and Cups range in size from 99″ down to 5/16″ O.D., with hundreds of die combinations for all intermediate dimensions.

FAST DELIVERY

. . . a matter of days from receipt of order. Available through hundreds of strategically located Belmont Industrial Distributors throughout the U.S.A. and Canada. Air delivery from factory in emergencies.

A SEPARATE COMPLETE PLANT

Devoted exclusively to advanced techniques in leather packing manufacture. Backed by a quarter-century of experience in this specialized field.

FROM FIRE-SAFE HYDRAULIC FLUIDS TO AIR

Belmont Leather Packings are supplied untreated or impregnated with Rubbers, Plastics or Waxes to meet requirements of modern usage on all media including fire-safe hydraulic fluids, oils, oxygen service, foodstuffs, water, water-oil emulsions, lubricated or dry air.

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Buy from the Leaders in Leather. Buy Belmont. See Conover Mast Purchasing Directory for Belmont Distributor nearest you.

The Belmont Packing & Rubber Company
Butler & Sepviva Streets, Philadelphia 37, Pa.

BELMONT

Heavy-duty Badger water meters

maintain high accuracy ... low pressure loss

These precision-built Badger meters are designed for heavy industrial service.

Disc meters are available from ⅝″ to 2″; turbine meters, from 2″ to 12″ inclusive. 2″ stainless steel oscillating piston models also available. All handle flows to 212° F.

Typical applications: Batching meters for chemical and fertilizer plants; interdepartmental metering; regulation of water treatment. Electric alarm, electric contacting and remote reading registers are offered as accessories.

Write for descriptive literature

Badger Meter Mfg. Co.

Industrial Products Div. • Milwaukee 23, Wis.

Disc meter

Turbine meter

For more facts Circle 554 on Reader Service Card

KEEP INVENTORY MESHING SMOOTHLY WITH PRODUCTION

Acme Visible Cabinets give you inventory control at a glance

With an Acme Visible Control System on guard, there'll never be shortages in materials or equipment, or spare parts to interrupt the smooth flow of production. Inventory facts are at your fingertips. Visible signals flag your eye whenever an item needs reordering. For full facts on how you can control inventory this easy, efficient way . . . mail the coupon.

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For more facts Circle 555 on Reader Service Card

FACTORY / CATALOG NEWS

Begins on page 258

For more about these items, circle item numbers on Reader Service Card next to back cover.

22—Contactors and Starters. Bulletin GEA-7020 (20 pages) contains information about contactors and starters including combination, reversing and two-speed forms, modification kits. Installation details. *General Electric Co.*

23—Generator Brush. This 4-pager (EB-100) describes new Equaload brush that reduces commutator wear and threading to minimum. Brush has molded-in shunt, is insulated from holder by special coating. *Hanson-Van Winkle-Munning.*

24—Battery Chargers. Three booklets: No. 203 covers battery chargers with output range 0.05-2.0 amp.; No. 236, trickle chargers, 50-200 ma.; No. 237, automatic chargers that control charging of starting batteries. *Automatic Switch Co.*

MATERIAL HANDLING

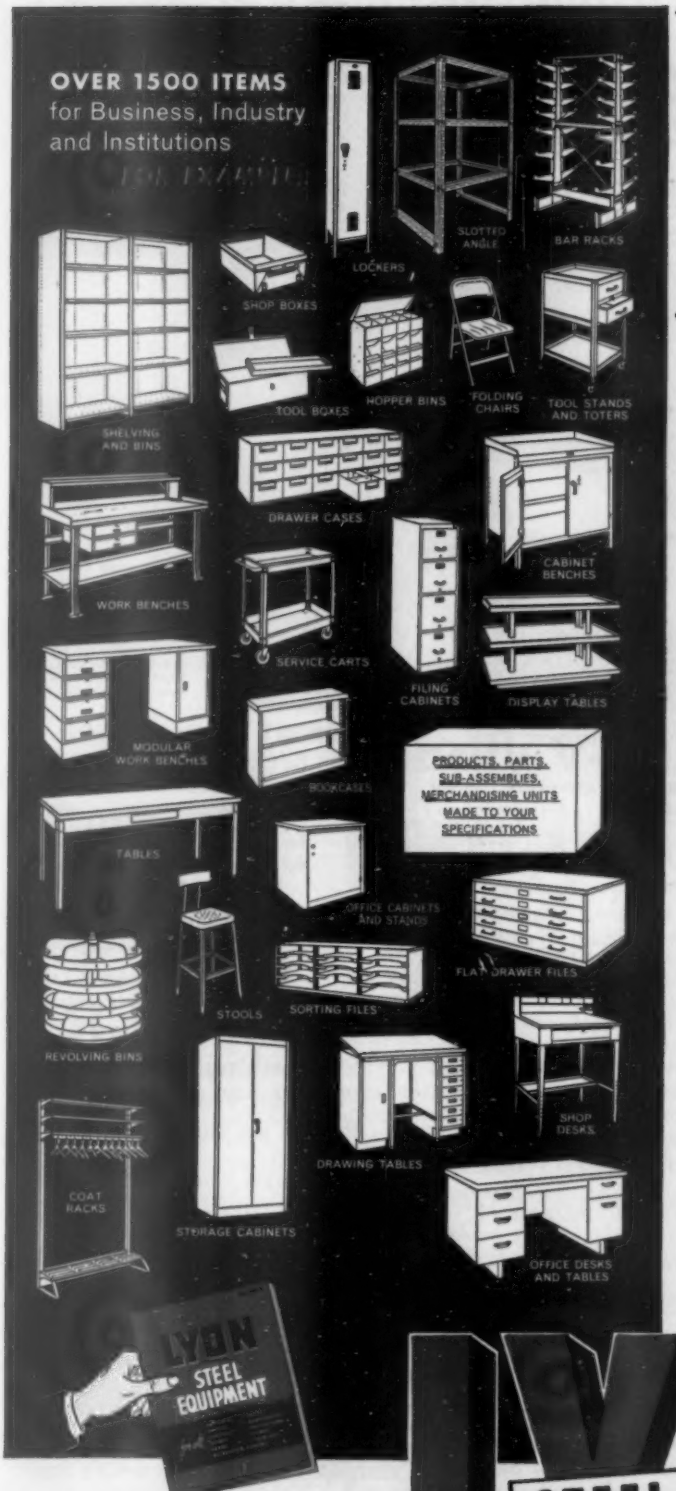
25—Conveyor Transfers. Want to know 42 ways to transfer materials by conveyor? Data book (14 pages, Nos. DB1525-1538) shows transfers that involve gravity to gravity, gravity to power, other systems. *The Rapids-Standard Co., Inc.*

26—Flexible Container. Catalog SPD-102 (revised) is a 4-pager that describes Adjusta-Pak, an adjustable master container "that's always just the right size." Photos. *Signode Steel Strapping Co.*

27—Storage Structures. Bolted steel storage structures, square storage tanks, storage units for bulk handling, and special bins are covered in 4-pager (207-A). Gives diameters, heights, and capacities. *Sprout, Waldron & Co., Inc.*

28—Crawler Crane and Excavator. Here's a 20-pager (No. 720-CG-3) that covers company's 200 Series machines. Features include a new positive-pressure backhoe, and positive rope crowd shovel attachment. *American Hoist & Derrick Co.*

Turn the page



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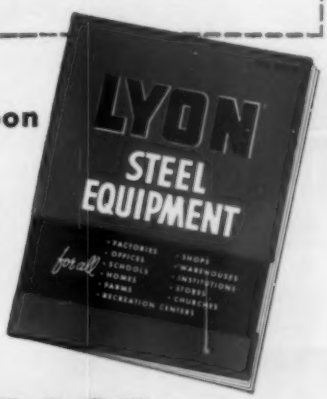

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1 PROVIDE PARTS CLEANING SOLVENT CANS AT THE MACHINE

Keep machinists doing productive work—eliminate unnecessary trips to centrally located parts cleaning station. Machine Bench Can attaches to machine or bench. Depressing fire safe Dasher dips parts; releasing pressure returns parts for draining. 10" x 7" x 8" deep; Capacity 2 gallons.

2 CLEAN SMALL PARTS AT WORK STATION IN AIR OPERATED MACHINES

Clean small machined parts in flammable solvents safely and automatically with Protectoseal Air-Matic Parts Washers. Require no attention from operator during wash cycle. Parts in basket are moved through solution to provide effective cleaning action. Operate on 35 psi. Cap. 6 gal; 30 lb. basket load; 15" x 15" x 25½" deep.

3 APPLY FLAMMABLES WITH AUTO MATIC PLUNGER CANS

Use automatic, fire safe Protectoseal Applicating Cans for assembly or cleaning operations requiring use of flammable solvents. Depressing dasher pumps a measured quantity of solvent into dasher cup to dampen swab, brush, or sponge. Saves time, solvent, reduces toxic or explosive vapor hazard. Made in 7 sizes; capacities to 2 gallons of solution.

Write for Protectoseal Catalog of fire-safe products for handling, dispensing, and use of flammable liquids in production operations.

THE PROTECTOSEAL COMPANY
1962 S. Western Ave. • Chicago 8, Illinois

FACTORY / CATALOG NEWS

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For more about these items, circle item numbers on Reader Service Card next to back cover.

29—Fork-Lift Pallet Rack. Have you a dock layout problem? Here are two useful booklets: No. 421-1 is a 4-page freight-handling analysis. No. 153 (8 pages) is an analysis of a one-man-crew operation. *Lewis-Shepard Products, Inc.*

30—Material-Handling Equipment. This 16-page illustrated catalog presents storage bins with 4-way lift-truck entrance, automatic dump boxes with gravity latch lock, and other equipment. Special sizes are available. *Palmer-Shile Co.*

31—Fork Trucks. Two trucks designed for use on rough, soft, or difficult terrain are shown in Catalog SS-2016 (8 pages). Ranger 40 truck has capacity of 4000 lb., Ranger 60, 6000 lb. Specifications, photos. *Clark Equipment Co.*

32—Pneumatic Conveyors. Fact File ER-G-9 is a concise 8-pager, "Selection and Use of Pneumatic Conveyors." Special sections discuss elements of three basic systems, including components, conveying lines, valves, indicators. *Fuller Co.*

MAINTENANCE

33—Gaskets. The Palmetto line of gasketing and gaskets for flanges, joints, furnace doors, and similar applications is discussed in Catalog GG-1259 (12 pages). Describes sheet, tape, rope, lagging, and wick packings. *Greene, Tweed & Co.*

34—Fire-Retardant Paints. Here's a 12-page pocket-size booklet (No. 100) titled "Paint Your Way to Fire Safety." Explains how fire-retardant paint works and how to apply it. *Albi Mfg. Co., Inc.*

35—Dirt, Dust Control. Colorful 4-pager tells all about the Statronic system that is used exclusively for dirt and dust control. Two diagrams show typical system air flow and secondary air dirt control. *CRS Industries Inc.*

Turn the page

HOW TO FILL ORDERS FAST AT HALF THE COST

USE Battery electric lift truck with "hitch-hiker" platform.

The user reports Walkie-Worklifters reduce manual labor 50%, permit greater use of space in this new warehouse with racks 14 feet high and aisles four feet wide. The operator rides on an auxiliary platform. Truck is powered by industrial battery.

ECONOMY Walkie-Worklifter
4527 W. Lake Street, EStebrook 8-9110
Chicago 24, Illinois

Circle 558 on Reader Service Card

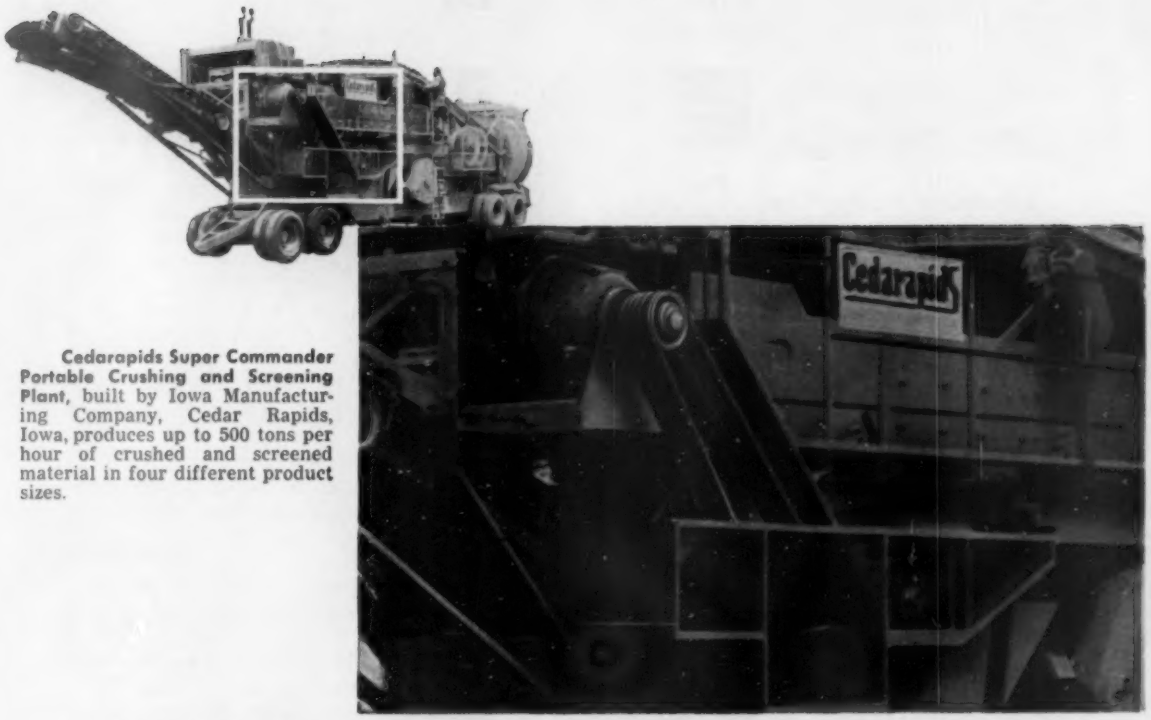
ANSWER

to Worthington "Hidden Value" Puzzle on Back Cover

The fictitious "hidden value" is *Adjustable Roller Main Bearings.* The design of any balance opposed compressor makes roller bearings impractical from a maintenance standpoint. Worthington balanced opposed compressors use centrifugally cast sleeve bearings which can be removed for inspection or maintenance without disturbing the crankshaft or removing the connecting rod from the frame.

Circle 384 on Reader Service Card

Circle 557 on Reader Service Card



Cedarapids Super Commander Portable Crushing and Screening Plant, built by Iowa Manufacturing Company, Cedar Rapids, Iowa, produces up to 500 tons per hour of crushed and screened material in four different product sizes.

This high capacity V-Belt Drive handles

60% more power in 30% less space!

Higher Capacity of Gates Super HC V-Belt Drives solves complex product-development problem!

In developing a larger crusher, requiring more horsepower, Iowa Manufacturing Company was faced with the problem of transmitting 400 hp from a higher-speed engine in a space that had been just enough for conventional V-belts carrying 250 hp.

At the higher speeds, centrifugal force made it impossible to go to larger sheave diameters to accommodate larger belt sections. A wider span of belts was ruled out by Highway Department requirements, which restricted overall machine width to eight feet.

Iowa Manufacturing's designers solved their primary problem of transmitting 60% more horsepower with new Gates Super HC V-Belts.

Because Super HC V-Belts have smaller cross section, use narrower and lighter-weight sheaves, pack higher hp capacity in a smaller 'package' than conventional V-belts, designers also succeeded in reducing drive weight, width and height — a decided bonus in equipment that must be moved frequently both on and off the highway.

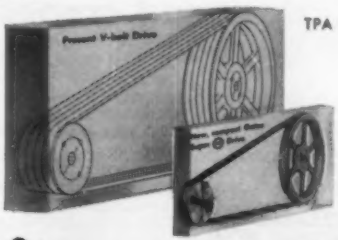
Nation-Wide Engineering Service

There's a Gates Distributor nearby to show **you** how to reduce drive weight, space and cost with Super HC V-Belt Drives. With Super HC, sheave diameters can be reduced 30% to 50%, drive space up to 50%, and drive weight 20% or even more.

Ask your Gates Representative for your free copy of "The Modern Way to Design Multiple V-Belt Drives," or write to The Gates Rubber Company Sales Division, Inc., Denver, Colorado.

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates *World's Largest Maker of V-Belts*



TPA 503A

Gates Super HC V-Belt Drives

same hp capacity in smaller "package"

For more facts Circle 560 on Reader Service Card

ADAMS

. . . Superior Performance at Lower Prices

Adams Aftercoolers provide superior condensation of pipeline oil and water vapor by reducing gas or air temperature to within 10° of cooling water. This performance, unique in the industry, is made possible by Adams' specialization in these units for over 25 years. During this time, mass-production techniques have developed these superior design features at a lower purchase cost:

12-PASS WATER CIRCULATION — provides maximum heat exchange from tube bundle — cooler discharge air.

FREEDOM FROM OPERATING TROUBLES — full floating rear tube sheet compensates for expansion. Floating tube sheet is machined parallel after rolling to assure long life to packing seal. Packing gland is locked rigidly in place on adjustable studs to isolate pipe line expansion strain, thereby protecting the packing.

ADAMS CYCLONE SEPARATORS have an exclusive cyclone design for maximum extraction of oil laden condensate; their separation efficiency is constant over a wide range of loads — features not found in other separator designs.

WRITE TODAY for Bulletin 714 for the engineering details that make Adams your best value for clean, dry, cool compressed air or gas.

R. P. ADAMS CO., INC. • 215 East Park Drive, Buffalo 17, N. Y.

AFTERCOOLERS

For more facts Circle 561 on Reader Service Card

Your ideal source for custom-designed cranes—CONCO

This unique installation combines a 2-ton, 38'5" span circular crane and a 20-ton, 24'2" span annular crane, each with a 130' lift. One engineering problem solved: On the annular crane the outside wheels must travel at 195 FPM; the inside wheels at 125 FPM. Conco builds cranes for virtually every class of service, including specialized spark and explosion-proof cranes, two-hook cranes, and cranes employing closed-circuit TV remote control operation. A complete design service, including sample specifications, is available. Write us for bulletin 500B covering the Conco line of cranes, hoists and trolleys.

CRANES HOISTS CONCO

Material Handling Division
CONCO ENGINEERING WORKS, INC., Mendota, Ill.

AFFILIATES: Spartan Tool Division—Powered Sewer Cleaning Equipment
Field Control Division—Barometric Draft Controls
Conco Building Products, Inc.—Brick, Tile, Stone

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For more about these items, circle item numbers on Reader Service Card next to back cover.

36—Vacuum Sweeper. Advantages and step-by-step operation of a large-capacity machine are shown in a 6-page brochure. Machine sweeps a 7-ft. 4-in. path, has a powerful vacuum system, is easy to operate. *G. H. Tennant Co.*

PIPES AND VALVES

37—Relief Valves. Multiport relief valves for automatic relief of overpressure in steam, air, and gas systems are covered in Bulletin 5200-A. Valves have from three to 21 internal spring-loaded adjustable disks. *Cochrane Corp.*

38—Couplings, Hose Fittings. Application data, specifications, and other details are given in Catalog D-1. Photos show step-by-step instructions for assembling couplings to hose. Covers re-usable couplings, etc. *Anchor Coupling Co.*

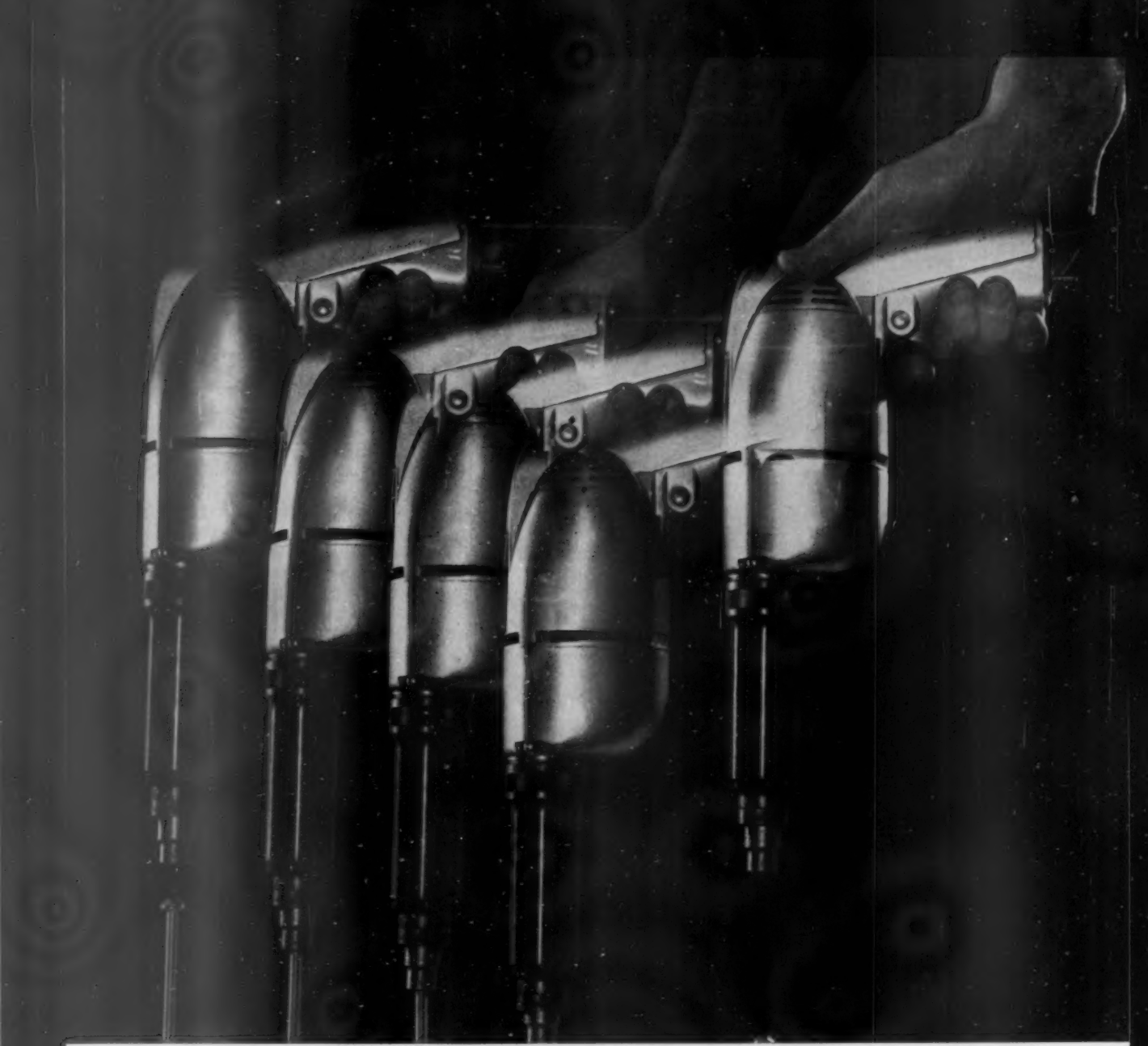
39—Unions, Valves. Catalog No. 60 (revised) has 20 pages of engineering information, sizes, weights, and dimensions for gasketless cup-orifice unions, ductile iron check valves, and other products. *Catawissa Valve & Fittings Co.*

40—Three-Way Valve. This 12-page bulletin (No. 91023) discusses full capacity series, three-way valves for air, oil, water, gas, chemical, or vacuum service. Pipe sizes: ¼ to 1 in.; operating pressure: 0-250 psi. *Airmatic Valve, Inc.*

41—Valves. Catalog 10-A (16 pages) is a revised edition that presents bronze, iron, and forged steel gate valves; bronze and iron globe and angle valves; others. Easy-to-read table of ratings, etc. *American Chain & Cable Co.*

42—Flexible Air Duct. Construction details and engineering data are given in 4-pager (No. 622). Covers air duct for air conditioning, ventilation, material handling, other uses. *The Wiremold Co.*

Turn the page



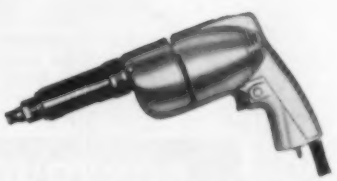
Exact Tension—500 screws or 500,000!

New Skil Anti-Ratcheting Driver rules out rejects

Set the torque on this driver for *any* assembly job and it'll stop driving completely the instant exact tension is reached.

A half million drives later you still get exact tension every time—never a stripped thread or damaged part, never a chance of costly rejects. And since torque control is not dependent on operator's skill, even beginners get the same fast, uniform results as experienced workers.

Drivers simply don't come any faster, any quieter, any better! Your Skil distributor has the proof. Ask him for a demonstration of either Model 235 (standard) or 272 (reversing). He's listed in the Yellow Pages under "Tools-Electric". Or write: Skil Corporation, Dept. 117F, 5033 Elston Avenue, Chicago 30, Illinois. In Canada: 3601 Dundas Street West, Toronto 9, Ontario.



Both models handle wide range of screw-driving and nut running jobs. Reversing model also does fast disassembly work.

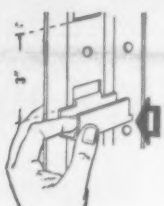
SKIL ... and SKILSAW POWER TOOLS

you can't expect a 5-foot-2 basketball player to score the most points

you can't expect to have the best shelving unless it's

BORROUGHS STEEL SHELVING

HERE are just a few good sound reasons why Borroughs Steel Shelving is your very best shelving buy: It's rigid—it's rugged—yet it's the most flexible, most rapidly assembled shelving on the market. Shelves can be installed or rearranged without nuts or bolts. No special tools are needed to assemble an entire unit. Each individual unit is complete in itself—any unit or shelf can be moved independently. No wonder Borroughs is recognized the nation over for top value in steel shelving! Get the complete Borroughs story!



send for catalog

Represented in Sweet's Catalog
Plant Engineering File 4G BO

Insert 4 shelf support brackets . . . no fumbling with studs, bolts, nuts or lock washers.

and then

Tilt shelf into support brackets . . . and shelf is ready for loading.

BORROUGHS MANUFACTURING COMPANY
OF KALAMAZOO
A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT
3020 NORTH BURDICK ST. amp KALAMAZOO, MICHIGAN

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For more about these items, circle item numbers on Reader Service Card next to back cover.

PRODUCTION

43—Power Saws. Here's a four-color, 12-pager (Form 59-39) that discusses new power saws for straight, metering, and angular cut-off work. Includes such features as new hydraulic power system, stock index scale. *The DoAll Co.*

44—Milling Machines. Company's expanded Toolmaster line is presented in Catalog M-2110 (24 pages). Machines come in four styles—the difference is in the spindle carrier design. *The Cincinnati Milling Machine Co.*

45—Miniature Electric Eyes. How electric eyes have solved problems of inspecting, sorting, counting, web control, etc., in all phases of packaging is told in "Miniaturized Electric-Eyes—Why and How" (No. 590). *Photomation, Inc.*

46—Air Tools. "Metal Finishing with Master Power Air Tools" is an illustrated 12-pager (G-60) with details about grinders, sanders, and wire brushing tools. Suggestions on how to get maximum output of work. *Master Power Corp.*

47—Multiform Grinder. Catalog FG-181-260 (12 pages) presents a machine for grinding annular forms and grooves in work pieces to 10 in. in diameter, 24 in. between centers. Grinding features and methods, other details. *The Sheffield Corp.*

48—Thread Rolling Heads. Bulletin No. F-99-3 (revised) has 6 pages of description about Nos. 3½, 5, and 7 Series of thread rolling heads. Discusses two head styles, self-opening operation, construction. *Landis Machine Co.*

49—Tracer Mills. Here's an 8-page catalog that illustrates the great variety of work these hydraulic tracer mills can do. Mills range from completely automatic to manual tracers in 1-, 2-, 3-dimensional models. *Famco Machine Co.*

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For more facts Circle 564 on Reader Service Card

For more facts Circle 565 on Reader Service Card ➤

COMBINATION STARTERS IN SPIN-TYPE ENCLOSURES

Here's Allen-Bradley's Bulletin 713 combination starter with circuit breaker—featuring conveniently removable spin-type cover and base—for use in hazardous gas and dust locations. Inside you'll find the time-tested A-B Bulletin 709 solenoid starter.

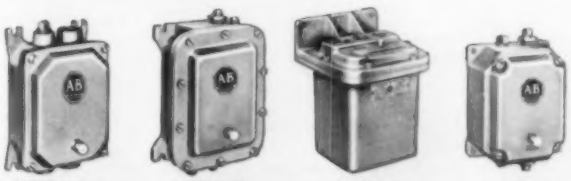
The consistent reliability of Allen-Bradley solenoid starters is a result of their design simplicity. With only ONE moving part, there's virtually nothing to go wrong—this is your assurance of millions of trouble free operations. In addition, the double break, silver alloy contacts are *always* in perfect operating condition—and remain so with *no* service attention. Also, all A-B starters have two permanently accurate thermal relays that protect motors against dangerous overloads. The reliability of these relays is not affected by atmospheric conditions.

To insure maximum production with minimum maintenance, always insist on Allen-Bradley *quality* motor control. Please write for full information.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

Cutaway of Enclosure
Shows Allen-Bradley combination starter. Screw-type cover and base permit quick access to the starter or the circuit breaker.

A-B Bulletin 713
Combination Starter



NEMA 4 Watertight Weatherproof
NEMA 7 Hazardous Gas Locations
NEMA 8 Corrosive Hazardous Gas
NEMA 9 Hazardous Dust Locations

These enclosures remain available. Because of the trouble free operation of Allen-Bradley control, bolted covers are not a problem.

8-60-718

ALLEN-BRADLEY

Member of NEMA

Quality Motor Control

MORE MILLIONS OF OPERATIONS

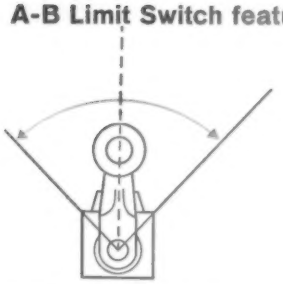
with Allen-Bradley Limit Switches

There's nothing now on the market to match the reliability and trouble free performance of Allen-Bradley Bulletin 802T limit switches. They are completely oiltight—operating heads and switch bodies are sealed against oils, coolants, and metal chips. Operators cannot become sluggish or "stick" in operation—contacts cannot become fouled. The double break, silver contacts are always in perfect operating condition—and remain so without maintenance.

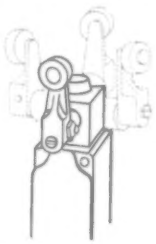
Insist on Allen-Bradley—the *quality* line of limit switches that will give you *many more millions* of trouble free operations.

Bulletin 802T Micrometer Adjustment Roller Lever Limit Switch ▲

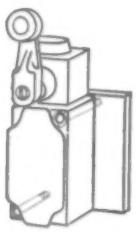
A-B Limit Switch features mean more life, more dependable trouble free service



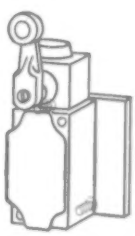
REPETITIVE ACCURACY—Unique toggle blade action assures operation at precisely the same point each time, without adjustment.



FLEXIBILITY—All operating heads can be rotated and fastened in any of four positions 90° apart.



FRONT MOUNTING



REAR MOUNTING

All Allen-Bradley Limit Switches can be mounted either from the front . . . or from the rear.

9-60-RM

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL

HOW GOODYEAR KEEPS CLOSE TABS ON QUALITY WITH MULTI-STUB TAGS

QUALITY CONTROL
PHYSICAL TEST SAMPLE TAKEN
No. 21505
Sample taken Hose Class C Style Water
Date 4-15-60 Order No. Lot 9300 Ply 3
Spec. 549-058 Size 2" I.D.
Insp. J. Harrison
DO NOT HOLD UP SHIPMENT OF THIS MATERIAL
Remarks: Make Physical Test to Railroad
This sample - Test to Railroad
Spec. AAR M604-48
QUALITY CONTROL OFFICE
TO BE ATTACHED TO SAMPLE

These three Dennison-produced tags are quality control tools at the Goodyear Tire & Rubber Company, Akron, Ohio. One has 12 stubs that control hose production and wage payments as well as 100% inspection. The other two have 3 stubs for initiating sample tests and for following through afterwards. These hard-working tags are typical of the dozens of wisely planned tag forms used by Goodyear. Together, they systematize work progress from receipt of crude rubber to shipment of hose, tires, conveyor belts and other quality-controlled products of "The Greatest Name in Rubber".

Multi-stub tags simplify systems at lowest practical cost when Dennison becomes your paperwork partner. Your tag forms cover vital information in the most orderly way . . . as you'd expect from America's first and largest source of patched tags. And, because Dennison-designed automatic machines integrate clear printing, strong patching, clean die-cutting and sharp perforating in a single high-speed sequence, Dennison delivers highest quality at lowest cost.

A free analysis of your tag systems with design suggestions and cost quotations is yours for the asking. Benefit from the longest experience in system-mating tags by contacting Dennison first.

Dennison

Helping you compete more effectively

FRAMINGHAM, MASSACHUSETTS

Sales offices in principal cities

See for yourself how the DuKane 10/1 telephone can give you instant information flow, better supervision, improved customer service, without adding to the load on your switchboard or tying up vital outside lines. Two to ten locations can dial each other for *private* talk. Voice paging for special areas. Rugged, fully automatic switchboard weighs only 11 pounds—fits anywhere in a jiffy. Beautiful desk or wall phones blend with any decor. Own for as little as $304.50 or lease if you prefer. Demonstrated in your own office—no cost or obligation.

DuKane Corporation Dept. F60
St. Charles, Illinois

Show how the DuKane 10/1 telephone system can help me.

Name_____

Company_____

Address_____

City, State_____

DuKane CORPORATION
ST. CHARLES, ILLINOIS

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For more about these items, circle item numbers on Reader Service Card next to back cover.

50—Cutting Tools. The many advantages of cast alloy tools are given in Catalog No. 55 (8 pages). Has specifications and diagrams covering solid square, round, and rectangular tool bits, and other tools. *Crobalt, Inc.*

51—Socket Screws. This comprehensive 82-page "textbook" (Form 2335) includes catalog data, design and performance details on fasteners for nearly every industry. Information on sizes, availability. *Standard Pressed Steel Co.*

52—Gages. New approaches to gaging problems and some gaging short cuts are discussed in this 4-pager (illustrated). Provides suggestions for the use of tenth plug gage kits, precision micro-ball kits, and other types of gages. *HI-Precision Grinding, Inc.*

INSTRUMENTS AND CONTROLS

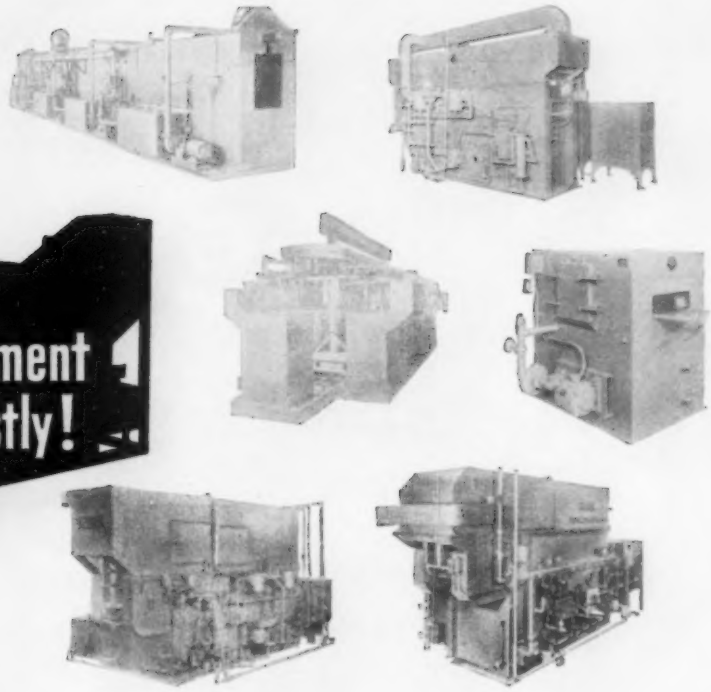
53—Lamp Annunciators. Bulletin No. A200 (24 pages) furnishes details for machine and equipment supervision, process control, automation systems in power plants, other applications. Selection guides and charts. *Edwards Co., Inc.*

54—Magnetic Starters. Engineering data on type "CY" a-c starters, in sizes 0 to 4, are given in illustrated 8-pager (PL-12-8-160). Describes company's arc quenching principle used on sizes 2, 3, and 4. *The Clark Controller Co.*

55—Computer Control. "A Return to Sanity in Computer Control" is the subject of this 28-pager. It covers some problems of computer control and gives step-by-step directions for developing a reliable system. *Beckman Instruments, Inc.*

56—Input Regulator. Brochure tells about Model INF, a bi-metal regulator that controls wide selection of electrical inputs to a heating ele-

For more facts Circle 567 on Reader Service Card

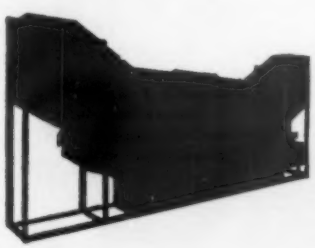


Detrex will lease a machine to fit your needs exactly and economically!

It is no accident that the Detrex nameplate is found on more cleaning equipment in more metal-working plants than any other—*by a wide margin.* Detrex has had more than 30 years' experience in designing this equipment—has the most complete and modern facilities for producing it—has the largest and most expert field force to help install and service it. And now you can lease any of your cleaning equipment requirements from Detrex. Whether you need a machine for degreasing, washing, rustproofing, phosphate coating, paint-bonding or paint stripping—whether you require equipment that is large or small—whether you desire a manual or automated operation—Detrex can supply your needs exactly and follow through with the service that means complete satisfaction.

Depend on DETREX for Every Metal Cleaning and Processing Need

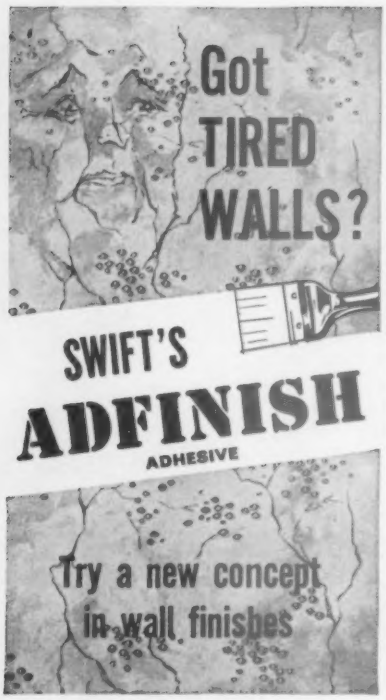
- PERM-A-CLOR NA (Trichlorethylene)
- Solvent Degreasers
- Ultrasonic Equipment
- Industrial Washers
- Phosphate Coating Compounds
- PAINTBOND Compounds
- Aluminum Treating Compounds
- Alkali and Emulsion Cleaners
- Rustproofing Materials
- Extrusion and Drawing Compounds
- Spray Booth Compounds



DETREX CHEMICAL INDUSTRIES, INC.

Box 501, Dept. F-660, Detroit 32, Mich.

World's Largest Exclusive Producer of Cleaning Chemicals and Equipment



Now you can finish new masonry or *refinish* old masonry with a *brush-on*, easy-to-use, fire-retardant adhesive finish that is chemical, moisture, and vermin resistant.

Swift's ADFINISH comes in three colors: Brilliant White, Bright Yellow, and Pearl Gray. Use it to brighten dry, damp and dingy walls:

Finish damp masonry surfaces

Impart moisture resistance to concrete block

Refinish concrete surfaces

Brush over brick and stucco

Return the coupon for details. Ask about ADCOTE for trowel application.

Swift

AD-10

JUST CLIP TO LETTERHEAD AND MAIL

105TH YEAR

Swift & Company
Adhesive Products Department
Chicago 9, Illinois

☐ Send bulletins on ADFINISH
☐ Send information on trial order
☐ Send details on ADCOTE

Name_____

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For more about these items, circle item numbers on Reader Service Card next to back cover.

ment or similar device. Lists advantages for many applications. *Robertshaw-Fulton Controls Co.*

57—Torque Tension Tester. Bulletin No. 214 (4 pages) discusses portable tension-testing precision instruments and their various applications. Come in three models: each is designed for specific bolt sizes. *Skidmore-Wilhelm Mfg. Co.*

58—Automatic Batching. Here's a 10-page handbook (Form MC-1-60) that outlines the advantages of automatic batching. Describes and illustrates simple procedures and equipment. Has batching time sequence chart. *Howe Scale Co.*

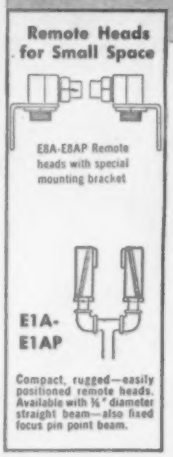
59—Controlled Evaporation. Two 4-pagers (Nos. 6017 and 6029) discuss the ConserVent, an all-weather tank vent to keep gasoline, solvent, and chemical tanks under constant low pressure or vacuum. *Conservation Equipment Corp.*

60—Dosimeters, Survey Meters. Bulletin 3115-9 (12 pages) covers 15 instruments, a variety of stray-radiation chambers, and scintillation probes. Includes details on transistorized chargers, other units. *The Victoreen Instrument Co.*

61—Indicating Gages. Miniature vertical-type gages with features such as scales and ranges are shown in Bulletin 59-1 (12 pages). These compact instruments measure draft, pressure, and temperature. *Republic Flow Meters Co.*

62—Measuring Instruments. Illustrated 12-pager (No. 19-60) describes electrical resistance testers, dielectric test sets, resonant reed frequency meters, tachometers, etc. *James G. Biddle Co.*

63—Clocks, Systems. Nine one-pagers make up a reference manual of technical and design information on master clocks and systems. Each "Topic" covers a particular phase of clock systems. Photos, diagrams. *Cincinnati Time Recorder Co.*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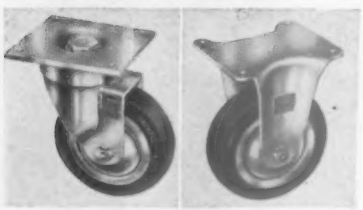

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FACTORY BOOKS

Straight Talk On Communications

Here at last is a communications text that is long on practical advice and short on vague theorizing. In *Managing by Communication,* author Willard V. Merrihue points the way toward better business communication in very direct terms.

Of particular importance to FACTORY's readers are the chapters on "Use of Communications in Crises" and "Management Philosophy and Practice in the Area of Risk-Taking Communication." These areas are, of course, frontiers pioneered by the author's employer, General Electric Company. And the author, speaking out of his intimate experience with that organization, leads the reader step by step up these hazardous but rewarding trails.

Worth the price of the book alone is the chapter on "Communications in Strikes." In it Mr. Merrihue documents how one company followed his 10-point program and consequently was able to reduce to 10 days an explosive strike that might have lasted three months.

The author presents a hard-nosed analysis of written communications techniques. He evaluates the worth of management communications such as newsletters, bulletins, policy manuals, and supervisors' handbooks. He discusses 13 kinds of employee communications. And draws such benchwork conclusions as "The employee newspaper . . . is the backbone of a written communication program."

Mr. Merrihue, regarded by many as the leading authority in this field, introduces such advanced concepts as modern marketing techniques to develop a positive program of employee communications. His view is that employee communications cannot be haphazard.

"A company must," says Mr. Merrihue, "study the basic needs and wants of its job customers through polling the supervisors and the employees, listening carefully to the union, and surveying community practices. Next comes the product-planning phase of designing better jobs to keep them up to competitive standards. Perhaps local salary and wage inequities must be corrected, or supervisors must be shown through example and training how to improve their relations with their subordinates; perhaps better market forecasting and production scheduling must be achieved to make jobs steadier, or sloppy procedures in administering benefits corrected."

This selection from Mr. Merrihue's text, like many, many others, typifies the realistic sort of thinking it demonstrates—and the sort that must prevail if communications are to be effective tools of management. (Reviewed by L. R. Bittel.)

Managing by Communication, by Willard V. Merrihue. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36. 306 pages. $7.

The Drinking Worker

This book is a tour of the aspects and treatment of alcoholism with special emphasis on industry's role in solving the problem.

The Drinking Problem and Its Control contains specific items for direct use by industrial administrators. The first chapter, for instance, includes a "test for alcoholic tendency" that determines whether or not a person has drifted from "social drinking" into problem drinking. Another chapter describes the eight stages of alcoholic progression and tells how to recognize them.

The author draws heavily on the corporate experience of his employer, E. I. du Pont de Nemours & Company, and on his own experience as its assistant medical director. This is good—good that his employer encourages a frank discussion of a sometimes embarrassing problem, good that we have a book by a medical doctor who has direct industrial experience with his subject. (Reviewed by M. F. Roberts.)

The Drinking Problem and Its Control, by C. A. D'Alonzo, M.D. Gulf Publishing Co., Box 2608, Houston 1, Tex. 130 pages. $2.95.

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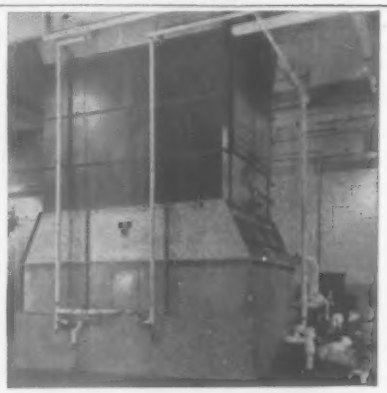

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Begins on page 278

The Healthy Worker

This is a comprehensive treatment of an ill-understood but important subject. Illness costs American industry over half-a-billion man-days annually. Lost wages alone total $6-billion a year, plus lost production, compensation, health insurance premiums, lowered efficiency.

With particular attention to small business, *The Health of People Who Work* goes far beyond a statement of the importance of employee health, both on and off the job. It offers concrete, proven methods for coping with the problem.

The authors have included suggestions for selecting doctors and nurses, evaluating the health program, establishing budgets and controls. They tell how to get help from community health councils, insurance companies, governmental health agencies. They advise how to gain internal support for the program, administer health education, deal with insurance companies and trade unions, handle alcoholism and other emotional problems. An appendix lists scores of organizations that will give further help and guidance. (Reviewed by Roger W. Christian.)

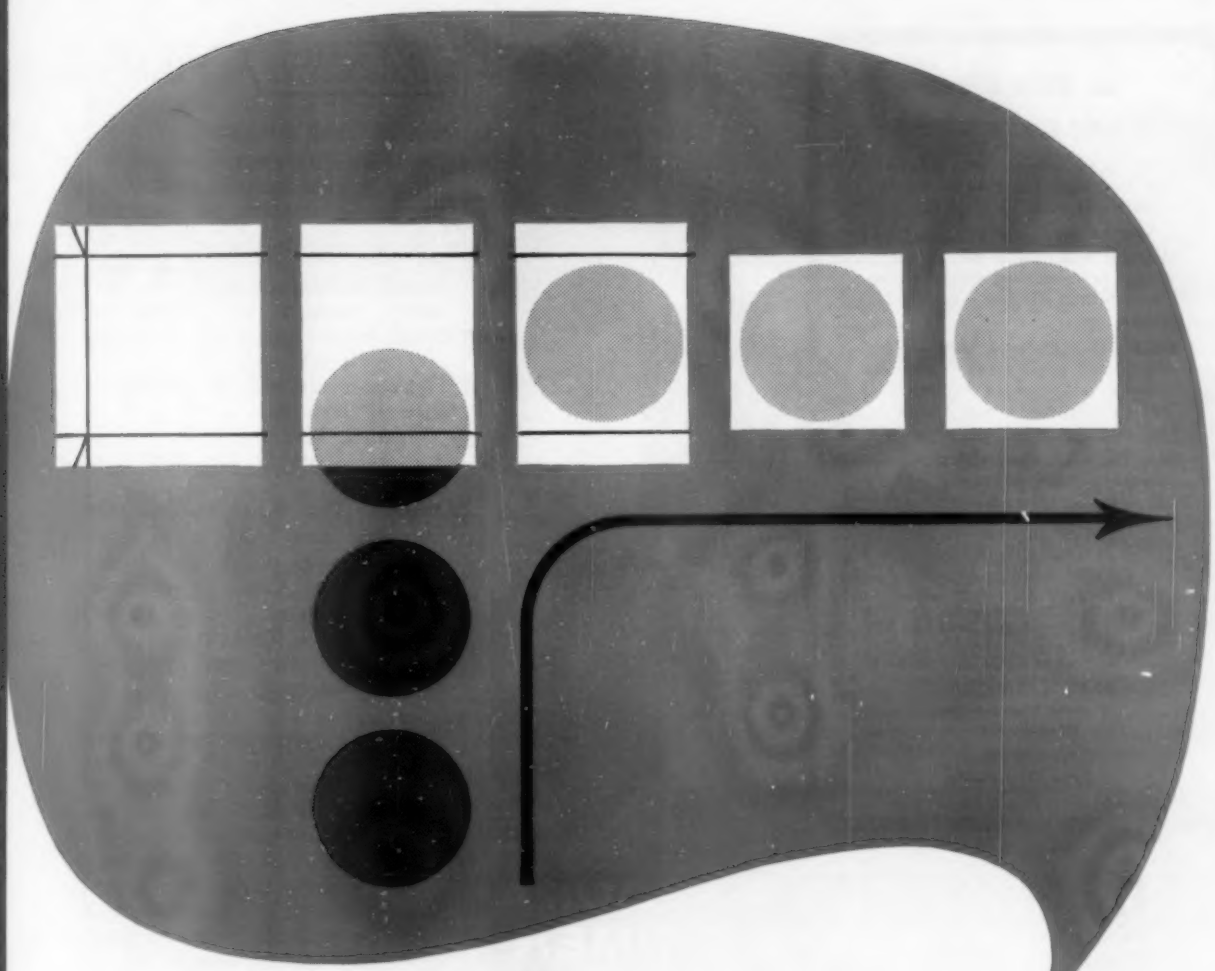
The Health of People Who Work, edited by A. Q. Maisel. The National Health Council, 1790 Broadway, New York. 268 pages. $4.50.

Management Speaks

Eighteen of the country's top management men give their candid views on what's right—and wrong—with today's executive practices and techniques. *Proceedings of the Top Management Seminar* is a collection of speeches given at the second annual seminar, sponsored jointly by the University of Miami and H. B. Maynard and Company.

Here are crisp, perceptive views presented in a highly readable, informative style. Boldness of imagination tempered with reality make these speeches refreshing reading.

Proceedings of the Top Management Seminar on Executive Practices and Methods. H. B. Maynard and Co., 718 Wallace Ave., Pittsburgh 21. 231 pages. $10.



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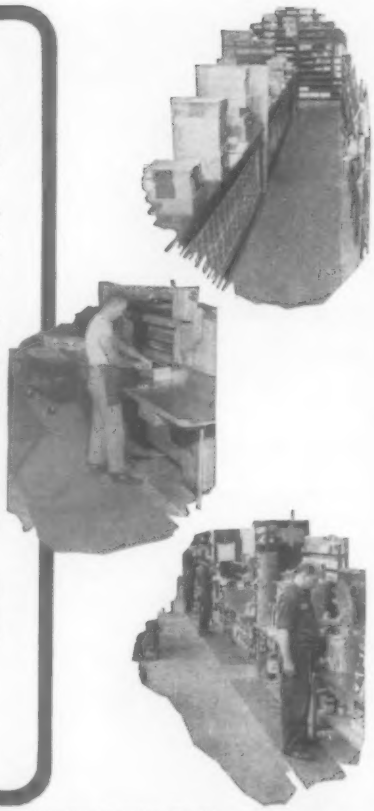

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FACTORY FILMS

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Sandvik Steel, Inc., 1702 Nevins Rd., Fair Lawn, N. J.

Planning Hot Water Systems tells about the latest trends in hot water supply system design and heater specifications. Covers applications and installations. 16mm, color, sound, 30 min. Write to:

A. O. Smith Corp., Permaglas Div., Kankakee, Ill.

Pattern for Instruction demonstrates a basic approach to job instruction training techniques. Designed to help both new and experienced supervisors, the film's opening sequence shows a group of supervisors passing a football. One man attempts to show another how to pass the ball —his instructions are not very good. In another training session, an instructor explains a successful four-step method under the headings: Prepare, Present, Try-Out Performance, and Follow-Up. 16mm, sound, 21 min. Write to:

Roundtable Productions, 8737 Wilshire Blvd., Beverly Hills, Calif.

This Is Automation depicts a practical, step-by-step plan for achieving automation. The film shows steps to increase productivity, improve quality, expand capacity, cut costs. 16mm, sound, color, 30 min. For loan, write to:

Association Films, Inc., 347 Madison Ave., New York 17.

Film Guide on Chemicals, Chemistry and the Chemical Industry lists 182 films in 11 categories that range in subject from the scope of a given chemical company to "The Petrified River—the Story of Uranium." For free copy of the guide, write to:

Manufacturing Chemists' Assn., Inc., 1825 Connecticut Ave., N. W., Washington 9, D. C.

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CALL REPORT MEMO

TO: T.R. Williams, Sales Manager

FROM: David Gentry, Midwest Rep.

The attached photo was taken in the loading tunnel of The Construction Aggregates Corporation's Ferrysburg, Mich. plant. It shows one of the shuttle cars (they serve as feeders for the various aggregate mixes from storage tanks above ground level) equipped with a Dage Model 63A TV camera. With this set-up, one operator in a control center can watch and control the action of five TV equipped cars.

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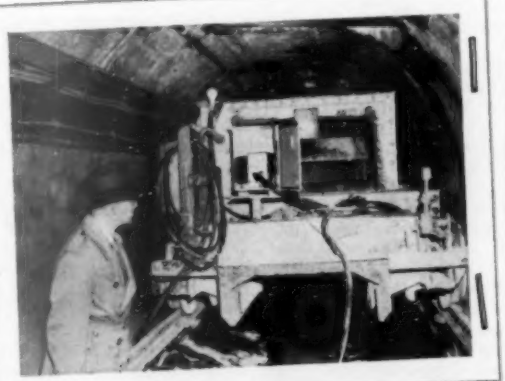

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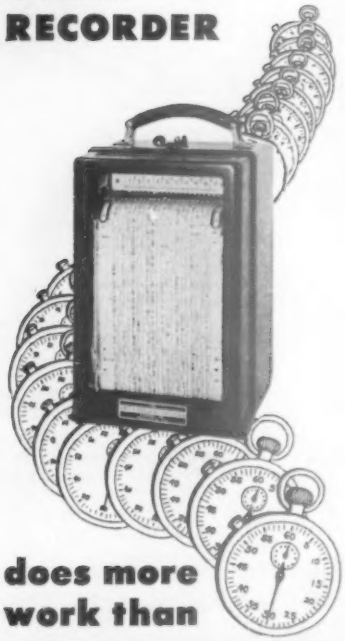

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ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

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275—Speed Reducers, Motogears. Catalogs 2747, 2751, 2618, 2824, 2724, 2719 on complete line. Link-Belt Co.

276—Fluid, PIV Variable Speed. Catalogs 2274 and 2747 give complete data and applications. Link-Belt Co.

277—Chains and Sprockets. Comprehensive catalog 1050 describes features of varied types. Link-Belt Co.

278—V-Belt Drives. Ask for free copy of "The Modern Way To Design Multiple V-Belt Drives." Gates Rubber Co.

279—Rolling Bearings. Bulletin gives complete information, including ratings, on this line. Dodge Mfg. Corp.

280—Pulleys. Technical data on taper-lock steel conveyor pulleys emphasizes strength and weight. Dodge Mfg. Corp.

281—Take-Ups. Bulletin lists range of stock models, sizes of roller, ball, babbitted types. Dodge Mfg. Corp.

PACKING AND SHIPPING

282—Power Strapping Machines. Complete information and applications on request. Signode Steel Strapping Co.

283—Stencil Labels. Free brochure shows how to incorporate them into present shipping methods. Sten-C-Labl, Inc.

284—Steel Strapping. Idea No. S4-9 and examples of how used by major companies in field. Acme Steel Co.

285—Marking Machines. Bulletin ROL-3 gives full data on automatic imprinting machine. Adolph Gotscho, Inc.

286—Automatic Weighing. Bulletins 2964, 2968, 2970, 9030 on scales for weighing and recording. Toledo Scale Corp.

ELECTRICAL

287—Motors. Details on custom-built air-cooled polyphase motors, 50 or 60 cycles. Valley Electric Corp.

288—Photoelectric Controls. Complete data, including specifications, applications. Cramer Controls Corp.

289—Unit Substations. Literature describes space, cost-saving features, and applications. Square D Co.

290—High-Voltage Cable. New booklet, DM-5903, "High-Voltage Durasheath Cable." Anaconda Wire & Cable Co.

291—Lighting Fixtures. Descriptive literature on features of "plug-in" type fixtures. Gibson Mfg. Co.

292—Limit Switches. Bulletin 802T covers micrometer adjustment roller lever limit switch. Allen-Bradley Co.

293—Combination Starter. Bulletin 713 describes combination starter in spin-type enclosures. Allen-Bradley Co.

294—A-S Drive. Bulletin tells about package-type—drive motor, operator's station, controls. Square D Co.

MATERIAL HANDLING

295—Conveyors. New handidrive handbook contains full data on maker's line and components. Standard Conveyor Co.

296—Batteries. Informative booklet gives complete facts on "price-cost" story. Thomas A. Edison Industries.

297—Self-Dumping Hopper. Here are details on handling all kinds of bulk materials. Roura Iron Works, Inc.

298—Storage Racks. Catalog has data on adjustable storage racks and applications. American Metal Products Co.

299—Yard Crane. Information on complete line, with capacity range from 5 to 55 tons. Unit Crane & Shovel Corp.

300—Steel Shelving. Catalog gives features of flexible, rapidly assembled shelving. Borroughs Mfg. Co.

301—Tramrail Cranes. Free engineering and application booklet (No. 2008) has full data. Cleveland Tramrail Div.

302—LP-Gas Carburetors. Literature tells how to reduce forklift truck costs. Marvel-Schebler Products Div.

303—Conveyors. New handbook of handling ideas with power-and-free conveyor equipment. The Rapids-Standard Co.

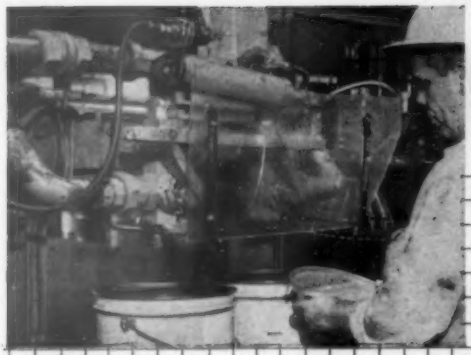
304—Monorail and Cranes. Has 52 pages of illustrated applications—industry by industry. The Louden Machinery Co.

305—Tote Pans. Big container catalog gives data on strong, lightweight, versatile pans. G. B. Lewis Co.

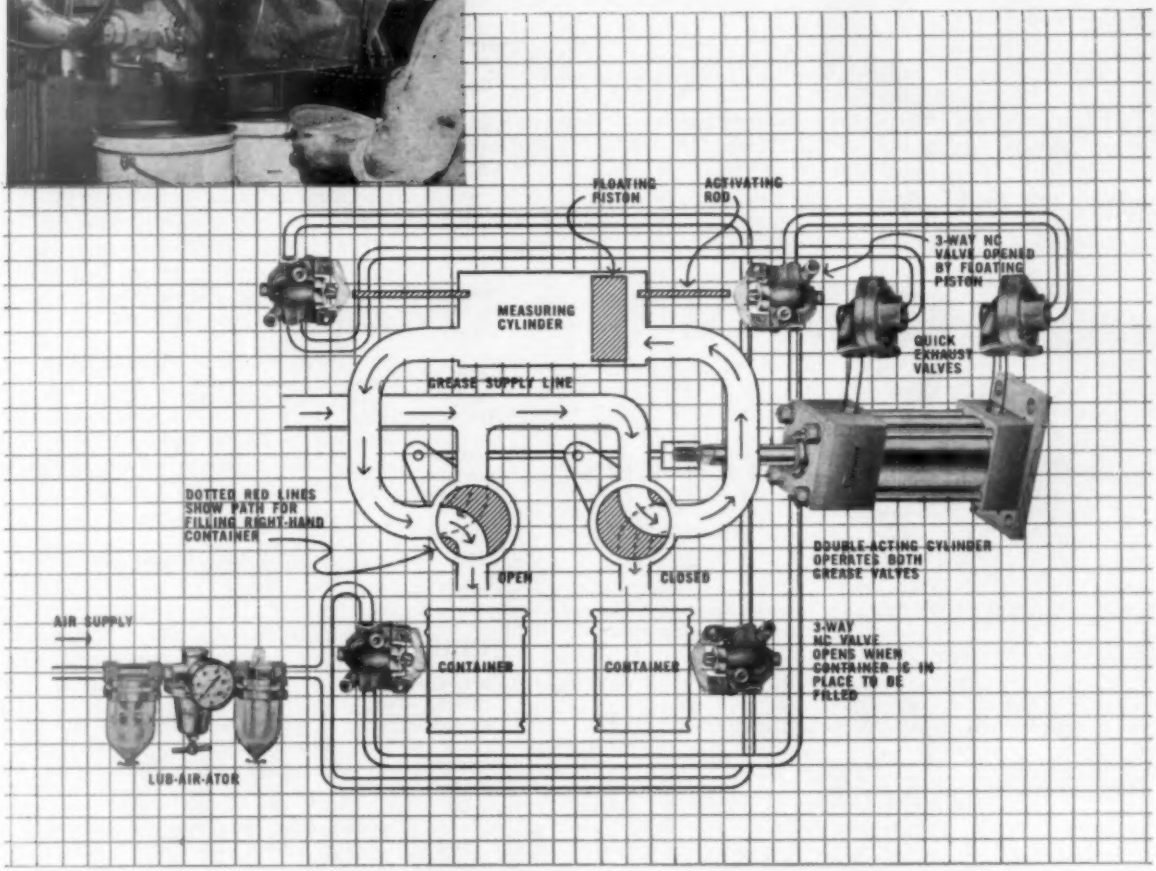
306—Steel Shelving. Catalog gives complete structural features. Columbia-Hallowell Div., Standard Pressed Steel Co.

307—Tractor-Shovels. Booklet, "Industrial Materials Handling the Payloader Way." The Frank G. Hough Co.

Turn the page



Here is an example of Schrader at work. Barrett Mfg. Co. of Houston, Texas, makes grease handling equipment for Mobil Oil's Brooklyn, N. Y., refinery. This machine fills 35 pound grease drums automatically accurately, 15 per minute! George Barrett, who designed and built this machine and other machines for Mobil, says: "My reputation for quality is too hard-won to risk by using some inferior line of air products."



PACKAGING EQUIPMENT MAKER DESIGNS MACHINES TO ORDER...AUTOMATES THEM 100% WITH SCHRADER AIR PRODUCTS

In limitless combinations, Schrader Air Products are performing thousands of jobs in thousands of plants. Wherever jobs are messy, tricky, heavy, monotonous or complicated—it pays to talk to Schrader.

Air is already available to you. Put it to work—on your own operations, or on the equipment you make for resale, like the company shown above. Just tick off its advantages: high speed and accuracy, low cost and maintenance—plus safety, simplicity, dependability. Air can do almost anything fingers can—and many things fingers can't.

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Select from the full Schrader lines to plan your automation of machines. Your Schrader distributor can help you pinpoint what you need. For more data, write:

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A. SCHRADER'S SON
Division of Scovill Manufacturing Company, Incorporated
457 Vanderbilt Avenue, Brooklyn 38, N. Y.

QUALITY AIR CONTROL PRODUCTS

For more facts Circle 586 on Reader Service Card

LOOKING for the RIGHT CUTTER for those *IMPOSSIBLE* METAL CUTTING *Jobs!*

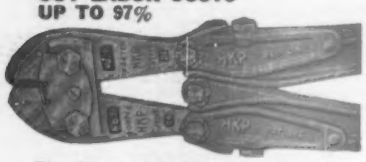
Here's the Curtain-Raiser to a Quick Solution!

HKP PORTER CUTTERS

There's a HAND or HYDRAULIC powered PORTER CUTTER to answer your toughest metal-cutting problems — over 100 different cutters, all designed to save you time, labor, and money! Make short work of cutting:

• Bolts • Rods • Screws • Rivets • Wire • Chain • Steel Strapping • Soft, Medium & Hard Metals & Many Others

CUT LABOR COSTS UP TO 97%



The famous PORTER CENTER-CUT CUTTER . . . our most popular tool . . . is the leading all-around cutter for industrial use! For Free Cutting of Soft and Medium Hard Metals up to ¾". Available in 6 sizes.

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The PORTER WORK-STATION CUTTER can increase one man's output up to 300% in continuous volume cutting! In 3 sizes — up to ½" capacity!

ALSO . . . for those RUGGED JOBS!

The PORTER HEAVY DUTY CUTTER cuts almost anything in metal up to ¾" diameter — thanks to its heat-treated, hard-tempered center-cut jaws! Comes in 3 sizes.

Contact your Industrial Distributor . . . or write for your free catalog with illustrated, detailed descriptions of the versatile PORTER line!

CUT up to ¾" rods with HAND OPERATED TOOLS — up to 1⅜" rods and 2½" pipe with POWER OPERATED TOOLS.

H. K. PORTER, inc.

Somerville 43, Mass.

ADVERTISERS' LITERATURE . . . *Begins on page 284*

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

308—Fork Lift Trucks. Catalog F-45T describes 3000- and 4000-lb.-capacity trucks. Elwell-Parker Electric Co.

309—Pneumatic Conveying System. Booklet has full details, gives applications. U. S. Hoffman Machinery Corp.

310—Electric Trucks. General catalog lists types and capacities of line of trucks. Elwell-Parker Electric Co.

311—Electric Hoists. Bulletin 15025-1C gives facts and structural features. Manning, Maxwell & Moore, Inc.

312—Cranes. Bulletin 500B covers complete line of cranes, hoists, and trolleys. Conco Engineering Works, Inc.

PLANT SITES

313—Kentucky. Here are full details on advantages of site for locating new plants. Commonwealth of Kentucky.

314—Nebraska. Gives information on manufacturing facilities available in northern plains. Northern Natural Gas Co.

315—Minnesota. "Minnesota Welcomes New Industry" gives complete facts in 112 pages. State of Minnesota.

316—Pennsylvania. Copy of "Plant Location Services"; details of 100% financing. Pennsylvania Dept. of Commerce.

MAINTENANCE

317—Lubricants. Informative booklet, "A Grease Schedule for Cost Control," is yours for the asking. Texaco, Inc.

318—Plastic Steel. Free case histories show how time and money can be saved in repairs. Devcon Corp.

319—Pipe Unions. Descriptive brochure on line and features of unions and union fittings. The Fairbanks Co.

320—Packings. Catalog SLP-659R has up-to-minute data and prices of self-lubricating packings. Greene, Tweed & Co.

321—Corrosion Prevention. Here is complete information on coal-tar based coatings and enamels. Koppers Co.

322—Floor Machine. Literature on combination scrubber-vacuum machines, electric and gas-powered. Finnell System, Inc.

323—Lubricating Devices. Catalog on full line of electric, air, or hand-operating equipment. Alemite Div., S-W Corp.

324—Paint. Free booklet tells how to save safely, shows what to use where, plus other facts. Sherwin-Williams Co.

325—Baling Equipment. Data covers automatic scrap handling and baling systems. East Chicago Machine Tool Corp.

326—Vacuum Cleaners. Bulletin, "Exidust Systems," tells about central vacuum cleaning system. Lamson Corp.

327—Lubricants. Free data book—a helpful treatise on lubrication—is available. Lubriplate Div., Fiske Bros.

328—Power Sweepers. Illustrated bulletin describes new, rider-type floor sweeping machine. G. H. Tennant Co.

329—Rust Preventive. Full-color catalog on new color horizon system has charts and applications. Rust-Oleum Corp.

330—Paint. Booklet, "Color Dynamics," explains what it is and how it can be applied. Pittsburgh Plate Glass Co.

BUILDING

331—Floor Plate. Bulletin SD-S10 gives facts and features of diamond rolled steel plate. Alan Wood Steel Co.

332—Plastic Panels. Detailed drawings; prices on replacing broken windows and sash sections. H. A. Harry Glass Co.

333—Acoustic Wall Panels. Folder tells how to solve sound control problems quickly, economically. Eckel Corp.

334—Complete Buildings. Complete literature has specifications on pre-engineered types. Stran-Steel Corp.

335—Steel Pipe Piling. Catalog (16 pages) covers foundation products. Armco Drainage & Metal Products, Inc.

PRODUCTION

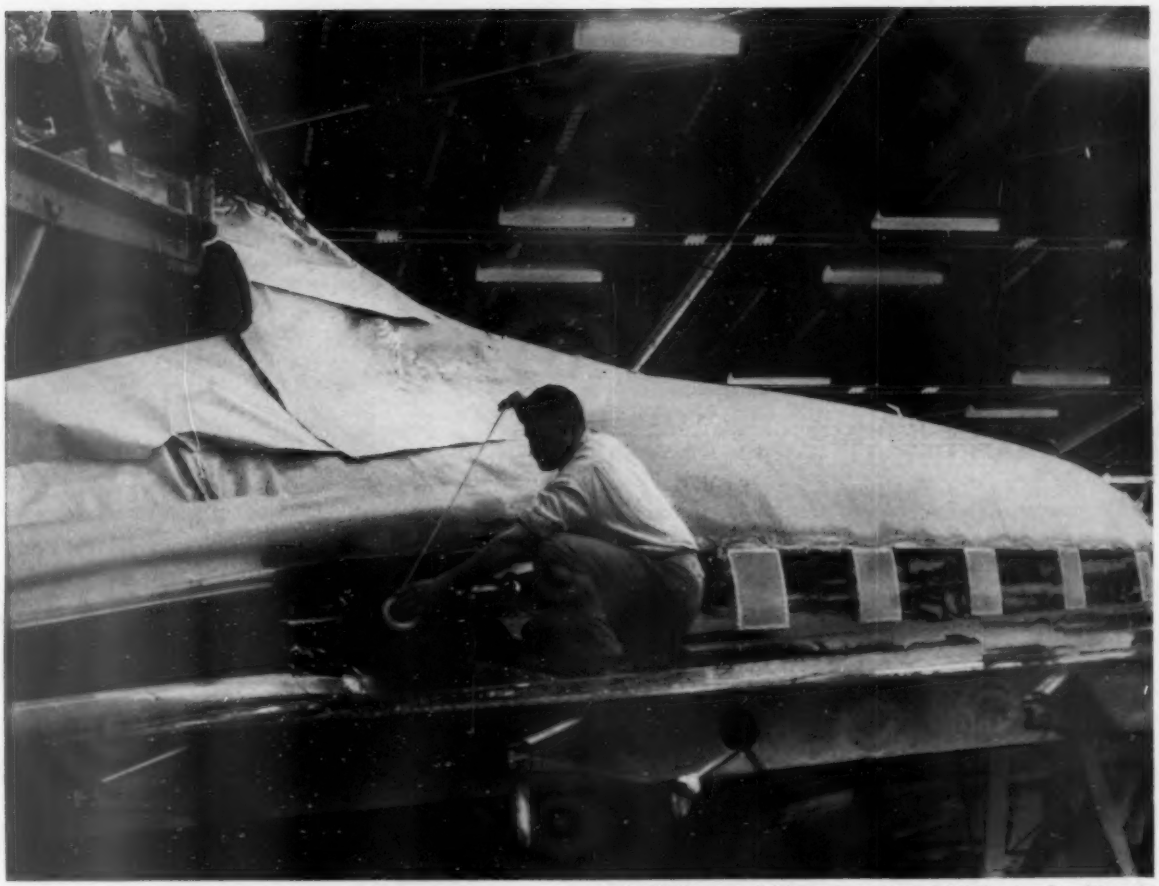
336—Air-Powered Routers. Informative literature and prices on two new series of routers. Buckeye Tools Corp.

337—Visible Record System. Folders on systems for inventory and production control. Acme Visible Records, Inc.

338—Drill Presses. Catalog shows 302 models, over 1400 accessories. Delta Power Tool Div., Rockwell Mfg. Co.

339—Safety Cans. Catalog of fire-safe products for handling, dispensing, using flammable liquids. Protectoseal Co.

Turn the page



Delta Air Lines uses Polyken paper tapes routinely in aircraft maintenance

Delta, *too*, sticks with Polyken

More and more big companies are taking advantage of the new Polyken paper tape line

Seen your Polyken representative lately? A lot's been happening. That famous Polyken quality, so highly popular and widely proven in plastic and cloth tapes, is now available in paper tapes.

Masking, sealing, bundling, packaging

You get a perfect combination of the right backing and proper adhesive. The result: Polyken paper tapes are a real pleasure to work with.

Conforms neatly, removes cleanly

The tape takes hold at a touch. Removal is smooth, residue-free. Handles easily. Resists both moisture and paint solvent.

Name the need—let your Polyken man provide the specifications and special attention. He's one of the industry's best trained technicians in the use and application of industrial tapes.

Find Your Nearest Distributor In The Yellow Pages

Check with your nearest Polyken Industrial Tape Distributor. Look in the phone book under "Tapes", or write to Polyken Sales Division, 309 W. Jackson Blvd., Chicago 6, Ill. (In Canada, write Polyken, Curity Ave., Toronto.)

Polyken®

INDUSTRIAL TAPES

THE KENDALL COMPANY
Polyken Sales Division

year 'round solid comfort
WITH BROOK MOTORS

Thousands of employees can work in air conditioned solid comfort in hundreds of offices, plants and institutions thanks to the quiet, economical, unfailing performance of Brook a.c. Motors—the motors you can install and forget—the better motors that actually cost less. All standard enclosures—1 to 600 H.P. The 30 H.P. BROOK open drip proof motor shown is one of many driving air conditioning equipment in the new State Office Bldg., Richmond, Va. Send for literature and name of your dealer.

SINCE 1904
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"World's Most Respected Motor"

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330 West 42nd Street, New York 36, N. Y.

ADVERTISERS' LITERATURE

Begins on page 284

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

340—Heat Exchangers. Bulletin P60 contains details on structural features and applications. Tranter Mfg., Inc.

341—"C" Clamps. Catalog CC-3000 has data and prices on new air-operated "C" clamps. Airmatic Valve, Inc.

342—Parts-Container. New systems handbook includes catalog, price data on ready-count containers. Alden Systems Co.

343—Electric Heaters. Catalog 60 gives structural data, types, sizes, and applications. Edwin L. Wiegand Co.

344—Sheet/Plate Fabrication. New catalog shows facilities and equipment for fabricating. Kirk & Blum Mfg. Co.

345—Photoelectric Control. Brochure NR-6 gives data on automatic industrial processes. Standard Instrument Corp.

346—Portable Power Tools. Get "How Planned Annual Retooling Earns Dividend on Payroll Dollars." Ingersoll-Rand Co.

347—Cylinders. Bulletin SM 155-4 lists range of styles, capacities—air or oil cylinders. The Tomkins-Johnson Co.

348—Portable Tools. Handbook (100 pages) for portable air-tool users shows complete line. Rotor Tool Co.

349—Data Processing. Brochure FS-43 gives full facts on system for getting fast information. Royal McBee Corp.

350—Dual-Drive Lathe. Bulletin 6-A has data on ultra-high precision machine. R. K. LeBlond Machine Tool Co.

351—Schedule Board. Booklet X-400 (24 pages) shows application of visual control board. Graphic Systems.

352—Contract Facilities. Data on contract manufacturing; sheet steel fabrication facilities. Republic Steel Corp.

PLANT SERVICES

353—Steel Lockers. Information includes structural features and installation service. Republic Steel Corp.

354—Compressors. Here's full information on 2-stage, air-cooled, 20 hp., two-cylinder unit. Gardner-Denver Co.

355—Plant Security. Brochure gives details on effective security service. Pinkerton's National Detective Agency.

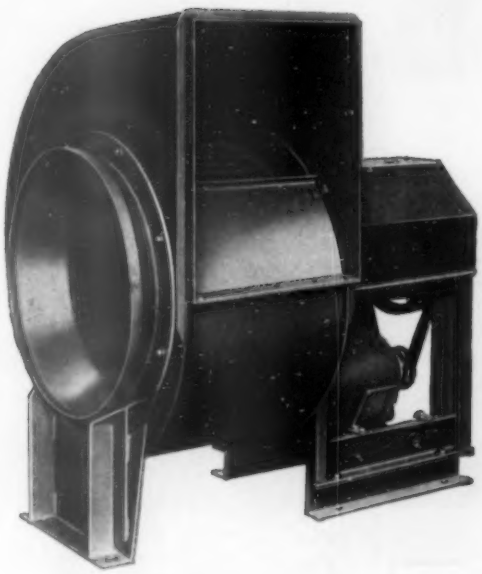
Turn the page

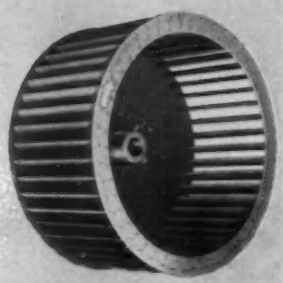
CLARAGE

New line of

V-belt driven

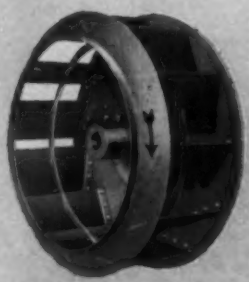
Ready Units





LS Ready Units have Low Speed, forward curved blade wheels. These are of the long-recognized Clarage Type HV multiblade design.

or



MS Ready Units have Medium Speed, backward inclined blade wheels with non-overloading horsepower characteristic. These are of the highly regarded Clarage Type NH, Class I design.

Exceptionally sturdy, quiet, ready-to-run fan sets

- for volumes up to 25,000 CFM
- for static pressures thru 2½"
- for clean air up to 300° F.

Distinguishing points — over 15 of them — make these new Clarage units outstanding.
To mention a few: Better motor ventilation . . . entire drive within frame of unit . . . complete accessibility to motor, drive, and bearings. Learn more about the numerous specific advantages that mean greater value to you from Clarage. Request Catalog 517 . . . 36 pages of complete information, selector charts, capacity tables, dimensions.

Clarage Ready Units are ideally suited for supply or exhaust jobs — indoors or outdoors — for buildings of all types, all sizes.

Write for your Copy

Dependable equipment for making air your servant

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SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

McGRAW-HILL BOOK NEWS

PEOPLE, PROBLEMS AND PROFITS

Just Published. This practical application of psychology to personnel problems guides you in managing more successfully by helping each employee develop and express his own personality. Discusses personnel evaluation, the psychology of work, and everyday techniques which managers use to bring out the best in workers. Clearly explains such topics as the psychology of using psychology; the "company personality"; communication; the art of making sense; face-to-face management; human relations with real human beings; and much more. **By S. W. Gellerman, Psychological Consultant. 252 pp., $5.95**

MANAGEMENT BY SYSTEM

Just Published. Enables you to analyze, simplify, and improve business routines and methods . . . insure orderly and efficient work-flow . . . and strengthen overall management direction and control. Shows you how to recognize system problems . . . set up the correct organization to handle them . . . develop a sound method of attack . . . and administer the entire program. Covers such modern aspects as conducting an electronics feasibility study; developing integrated data-processing applications; and improving management-information channels. **By R. F. Neuschel, Mckinsey & Co. 2nd Ed., 347 pp., 26 illus., $7.95**

PRODUCTION CONTROL

Shows how to achieve and maintain efficient control of plant production. Every aspect is covered—from the first evaluation of product orders from the sales department—through the various routing, scheduling, dispatching, progress control, and materials control operations—to problems connected with storing finished parts and products. Useful in any type of factory enterprise. **By Franklin C. Moore, Univ. of Michigan. Second Ed., 655 pp., 166 illus., $8.00**

PRACTICAL AUTOMATION

Shows how to install and use plant automation for increased productivity, lower operating costs, and improved safety. Gives scores of examples of successful installations from plants of all sizes in various industries—demonstrates actual applications and methods—in a way that helps you plan ahead for successful automation. **By L. R. Bittel, M. G. Melden, and R. S. Rice, all of** *Factory*. **376 pp., illus., $4.95**

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ADVERTISERS' LITERATURE

Begins on page 284

Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.

356—Dust Collectors. Illustrated brochure lists more than 50 models of collectors to choose from. Aget Mfg. Co.

357—Factory Furniture. Catalog 100 illustrates diversified line of steel equipment. Lyon Metal Products, Inc.

358—Water Meters. Descriptive literature of precision-built meters for varied applications. Badger Meter Mfg. Co.

359—Fans. Catalog 517 gives complete information, selector charts, capacity tables, dimensions. Clarage Fan Co.

360—Heat Exchanger. Bulletins 120, 124, and 135 give detailed information on heat exchanger. Niagara Blower Co.

361—Compressor. Bulletin 3405-B2 gives full descriptive data on new X line. Worthington Corp.

362—Air Conditioning. Booklet, "Will factory air conditioning pay off for me?" available on request. Carrier Corp.

363—Blower. Bulletin contains full information about blowers and exhausters for varied uses. Lamson Corp.

364—Pumps. Anniversary booklet (No. 198) traces development of pumps from earliest beginnings. Ingersoll-Rand Co.

365—Air Circulator. Full information, prices, and features of adaptable portable unit. The Premier.

366—Aftercoolers. Bulletin 714 gives complete details on maker's line of aftercoolers. R. P. Adams Co.

367—Shelving. Illustrated catalog describes new compression clip steel shelving. Republic Steel Corp.

368—Stainless Steel. Here's information on its advantages for food handling and serving costs. Republic Steel Corp.

369—Lighting Fixtures. Complete technical and photometric information upon request. Sylvania Lighting Products.

370—Industrial TV. Literature supplies information and guide to industrial closed circuit TV. Philco Corp.

371—Grass Mowers. Free "Mowing Magic" folder describes three riding-type sizes of mowers. Clean-Cut Mowers, Inc.

372—Fire Extinguishers. Brochure F-11 provides complete data on new all-class fire extinguishers. Alim Corp.

WHERE TO BUY

Featuring additional products, specialties & services for manufacturing plants

MORT CLARK'S **GALV-WELD** ALLOY ORIGINAL & GENUINE

Solves 1000 factory maintenance corrosion problems permanently. Used extensively in specialty-built machines and installations by maintenance departments. Solves roof cooling tower corrosion problems. Write for details. Free sample. GALV-WELD PRODUCTS, Dept. F, P. O. Box 1303, Bradenton, Florida.

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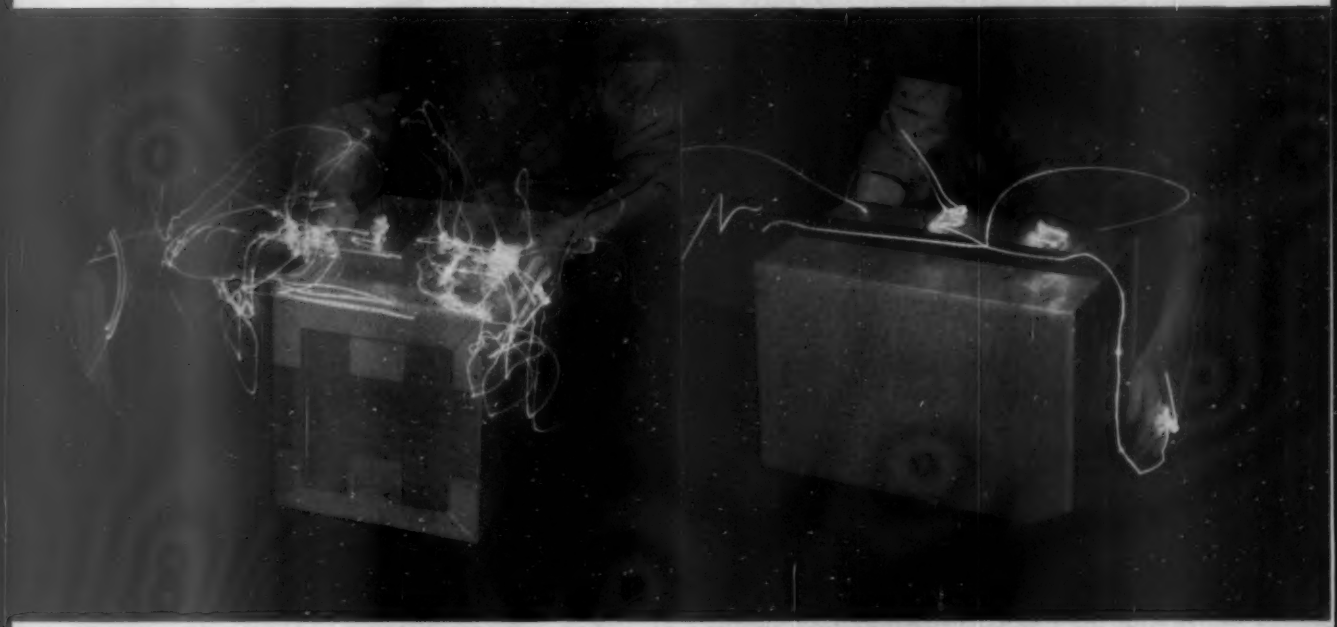
Consult these SPECIALISTS
Let them save your time by bringing their broad experience in their specialty to bear on your problems.

For more facts Circle 591 on Reader Service Card ➤

The Ludlow Method
2-STRIP CASE SEALING
FASTER – STRONGER – COSTS LESS



OLD WAY (38.5 Seconds) White lines show actual motions required for sealing *just the top* of a container with plain paper tape.

LUDLOW METHOD (11 Seconds) The same job is done in a single motion. And tough multi-directional fibre reinforcements make closures nearly 3 times as strong.

The tapes that broke the six-strip habit!

Ludlow's reinforced tapes, SNAKETAPE and GLASPUN, are so strong that only two strips are required to seal your cartons instead of the six strips required when plain paper tapes are used. This faster, stronger center seam closure method actually reduces your tape application costs by 66%. Both SNAKETAPE and GLASPUN are approved for shipment on all carriers, including railroads under U.F.C. Rule 41.

Be sure to specify *Ludlow* reinforced tapes — either glass-reinforced GLASPUN, or world-famous SNAKETAPE, the *only* reinforced tape with rayon reinforcement. The Ludlow name is your best assurance of uniform quality and dependability.

A - SNAKETAPE®
Rayon-Reinforced

B - GLASPUN®
Glass-Reinforced

LUDLOW PAPERS • Needham Heights, Mass. • Dept. 172

Please send me more information on the Ludlow 2-Strip Sealing Method. I am now using ☐ Staples ☐ Wire Stitching ☐ Plain Paper Tape

*Name*_____ *Position*_____

*Company*_____

*Street*_____

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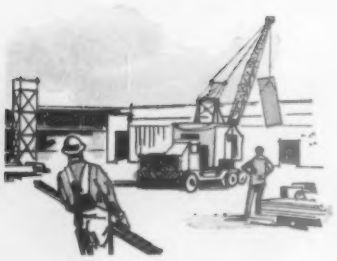
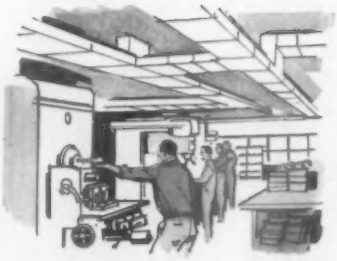
VPI-Coated Papers • Greaseproof Papers • Waterproof Papers • Poly-Coated Papers • Gummed Tapes • Federal Spec. Papers • Label & Specialty Papers • Plastics



Constructing a one-story factory?

Floor space valuable to you?



Don't want long runs of ductwork?

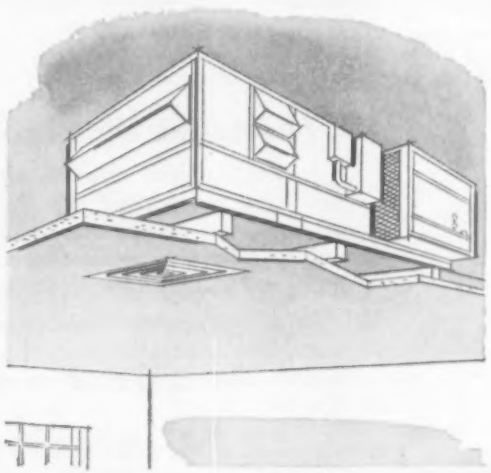
9 times out of 10 this is the most economical way to heat and cool a one-story factory!

With the new Carrier Commercial Weathermaker*, year-round air conditioning can be installed more economically in one-story factories. You don't have to give up an inch of valuable floor space, simply because this Weathermaker unit installs on the roof. And you don't have to put up expensive ductwork, simply because the unit connects directly to a ceiling air grille.

This unit is also designed to install with a minimum of time and trouble. It needs no water, no refrigeration piping, no charging with refrigerant. One or more units can be installed as required, and with the capacity you need: 7.5 tons of cooling and 200,000 Btus of heat . . . or 10 tons and 250,000 Btus. What's more, the compressor is protected by a 5-year warranty for worry-free operation.

For complete details about this Carrier Commercial Weathermaker, call the Carrier dealer near you. He's listed in the Yellow Pages. Or write Carrier Air Conditioning Company, Syracuse 1, New York.

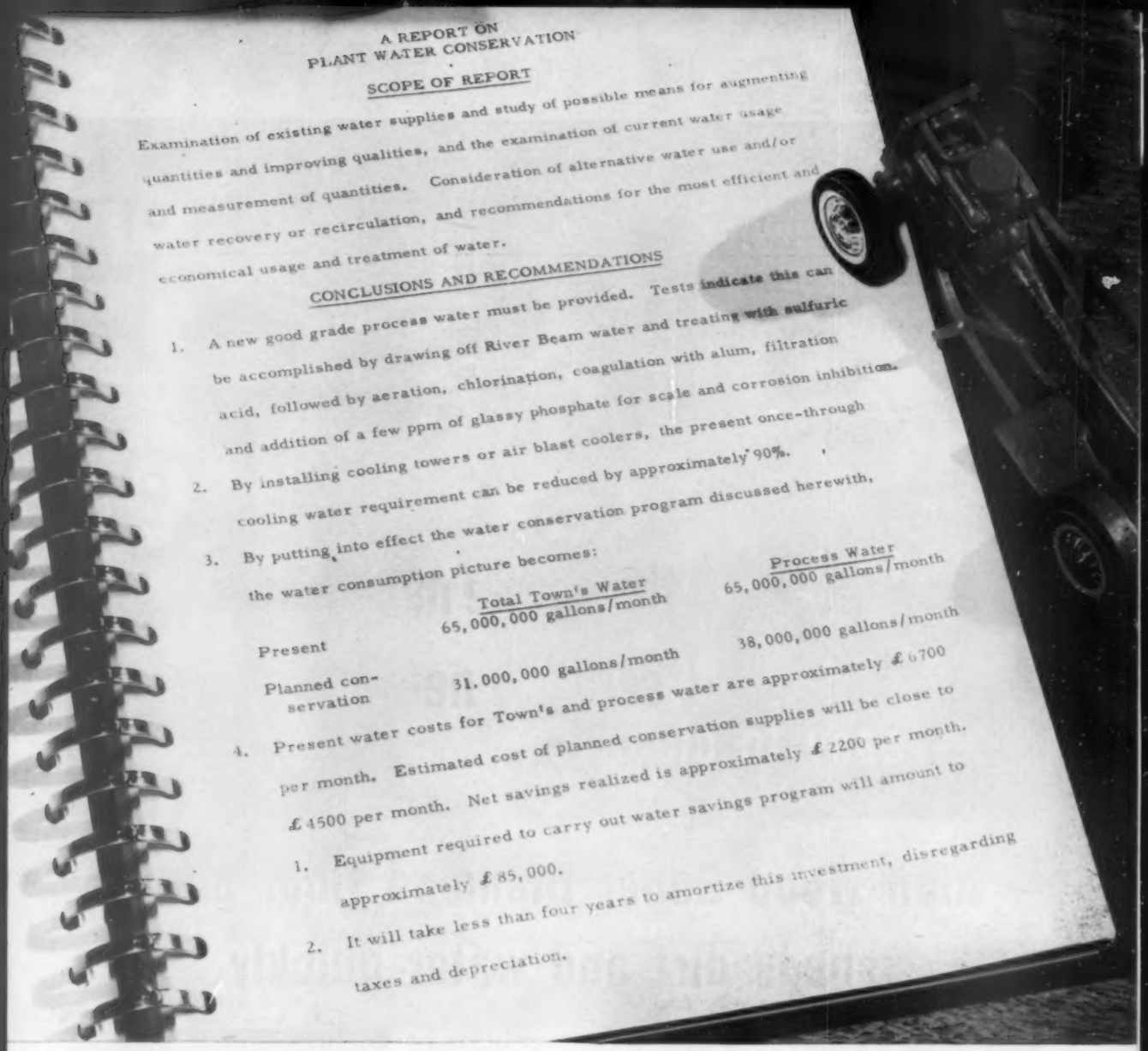
Reg. U. S. Pat. Off.



This Carrier 48B Commercial Weathermaker puts both your heating and cooling plant in the most economical of locations—your roof! It is supplied ready for fast one-unit installation. It is factory charged with refrigerant, equipped with refrigeration piping, and quickly connected through the roof to a ceiling air grille.

BETTER AIR CONDITIONING FOR EVERYBODY EVERYWHERE

Carrier


A REPORT ON
PLANT WATER CONSERVATION
SCOPE OF REPORT
Examination of existing water supplies and study of possible means for augmenting quantities and improving qualities, and the examination of current water usage and measurement of quantities. Consideration of alternative water use and/or water recovery or recirculation, and recommendations for the most efficient and economical usage and treatment of water.
CONCLUSIONS AND RECOMMENDATIONS
1. A new good grade process water must be provided. Tests indicate this can be accomplished by drawing off River Beam water and treating with sulfuric acid, followed by aeration, chlorination, coagulation with alum, filtration and addition of a few ppm of glassy phosphate for scale and corrosion inhibition.
2. By installing cooling towers or air blast coolers, the present once-through cooling water requirement can be reduced by approximately 90%.
3. By putting into effect the water conservation program discussed herewith, the water consumption picture becomes:
Total Town's Water
65,000,000 gallons/month
Process Water
65,000,000 gallons/month
Present
Planned conservation
31,000,000 gallons/month
38,000,000 gallons/month
4. Present water costs for Town's and process water are approximately £ 6700 per month. Estimated cost of planned conservation supplies will be close to £ 4500 per month. Net savings realized is approximately £ 2200 per month.
1. Equipment required to carry out water savings program will amount to approximately £ 85,000.
2. It will take less than four years to amortize this investment, disregarding taxes and depreciation.

More water...less money

Faced with an acute water shortage just when plant expansion became vital, this English manufacturer called on Hall Laboratories for help in solving this problem.

As shown above, the problem was solved: by rearranging water usage throughout the plant, by pinpointing a new source of water that could be made acceptable by proper treatment, by tracking down every plant operation where water was being wasted. The result—more than enough water for current plans *and* for future expansion—and at a substantial savings that will pay for needed new equipment quickly.

More and more, water is being recognized as Industry's most important raw material. It makes good sense to let Hall help you use it economically — from procurement to disposal.

HALL LABORATORIES
HAGAN CENTER, PITTSBURGH 30, PA.
Consultant on the Procurement, Treatment, Use and Disposal of Industrial Water

Write for new Hall Laboratories Brochure on your company letterhead — ask for HL-209.

DIVISION OF **HAGAN** CHEMICALS & CONTROLS, INC.

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Alan Wood Super Diamond floor plate sheds dirt and water quickly

Sweep it, hose it or mop it—A. W. Super Diamond rolled steel floor plate has no pockets to hold dirt or water. The perfectly designed pattern of Super Diamond makes it the easiest-cleaning floor plate on the market today. You can shear, form, weld and match this floor plate wherever necessary, and the unique arrangement of the pattern allows you to bend it any place.

Super Diamond has many other advantages, too . . . an easily matched well-known design pattern . . . and readily available from warehouses. It wears indefinitely, with no chipping, cracking or splintering. And feet get traction from *every* direction, even when plates are wet.

For safety . . . for easy installation . . . for long wear . . . specify Alan Wood Super Diamond. Write for Bulletin SD.—S10

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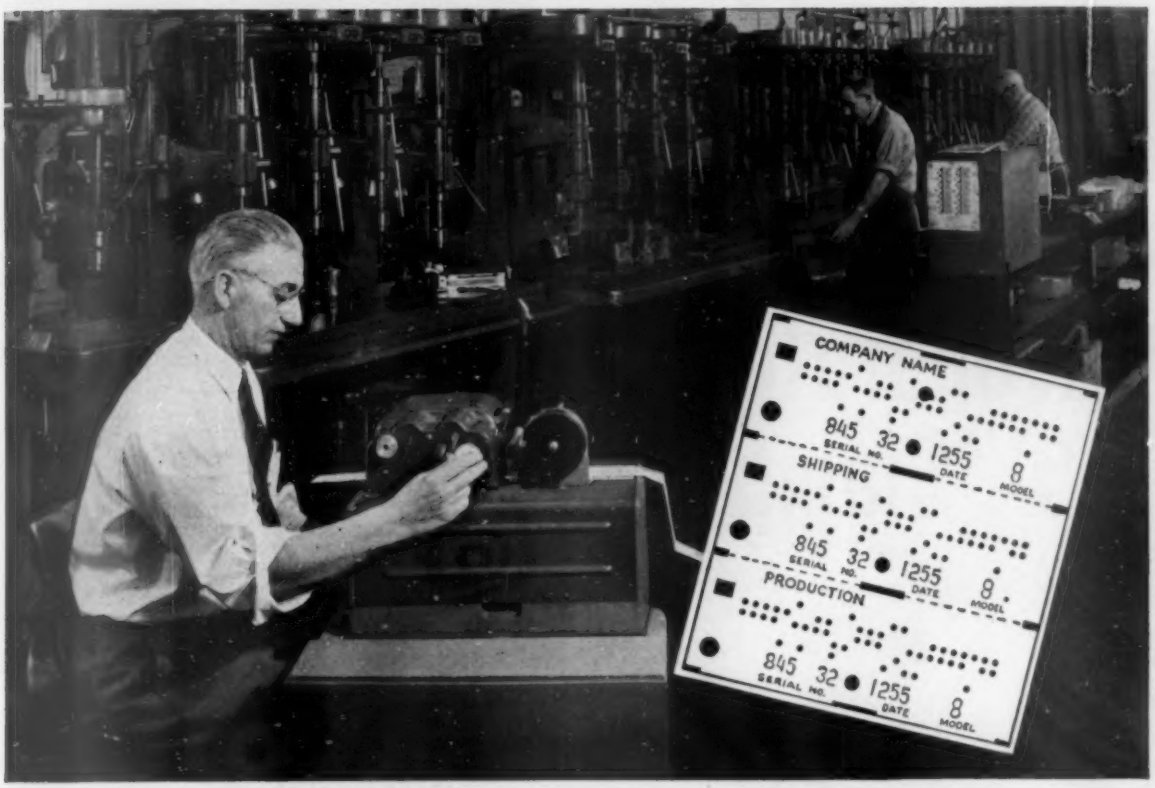
DATA PROCESSING THRIVES ON AN ERROR-FREE DIET!


COMPANY NAME
845 SERIAL NO. 32 1255 DATE 8 MODEL
SHIPPING
845 SERIAL NO. 32 1255 DATE 8 MODEL
PRODUCTION
845 SERIAL NO. 32 1255 DATE 8 MODEL

By recording information as it originates,
Dennison Print-Punch checks three common causes of input errors!

Minimizes manual recording! Smudged, illegible, temporary records never have a chance to infiltrate your tabulating room when portable Print-Punch Machines take over. Stationed where data starts, Print-Punch Machines create accurate machine-language records of all operations . . . from Receiving to Shipping and anywhere in between. Information takes only a few seconds to dial. Push a lever and 20, 25 or 31 column tickets come out printed and punched at speeds up to 300 stubs per minute.

Eliminates mutilated source documents! Small, durable Print-Punch Tickets travel along the production line with your product . . . withstanding abuses that damage larger, flimsier input media. Available serially or repetitively numbered in continuous strips of single or multiple stubs, Dennison Print-Punch Tickets can be tailored to fit almost any control or accounting system.

Reduces key punching errors and costs! Print-Punch Tickets are automatically converted to punched cards or punched paper tape without need for key punching. "Batch" machine-language records, created at the source by a single setting of a Print-Punch Machine, can often save hours and hours of key-punching time in the tabulating room. That's why key-punching costs shrink when Dennison Print-Punch goes to work!

Learn more about making your data processing more accurate with Dennison Print-Punch Machines and Tickets. Mail coupon today.

Dennison *Helping you compete more effectively*

Dennison Manufacturing Co., Machine Systems Division, Dept. F-104, Framingham, Massachusetts

Please rush your brochure on the use of Dennison Print-Punch Tickets and Machines for extending automatic data processing efficiency to inventory, reorder, production and inspection systems, payroll and cost accounting.

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"This $65 instrument saves me 60¢ an hour in production costs"

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what TRT is — An instrument that automatically records "on-off" time of **any machine or process.** Information is marked on a continuous, time-indexed tape. Marking stylus is electrically actuated. Tapes run 4 months.

what TRT does — Shows on tape **exactly when** "down-time" occurs, how long it lasts. Access window enables operator to write reason for stoppage. Visual counter totals **actual productive time.**

how TRT saves — TRT data-on-tape gives accurate, single-source basis for **cost-cutting** in plant or office: time study, production control, **preventive maintenance,** locating bottlenecks. **Write for free Brochure NR-6.**

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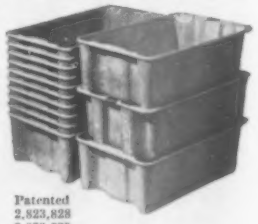

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LIGHTWEIGHT

Lighter than an aluminum pan of the same size, these general purpose Lewis fiberglass pans handle bigger payloads with less effort.

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This Stack-n-Nest® truck is only one of the many different Lewis containers, each designed for a variety of handling operations. There are trays, pans, boxes, and trucks to fit all your handling requirements.

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ROTARY OR CENTRIFUGAL

...Which one is best for your application?

Rotary or centrifugal? Sometimes the choice is easy. For example, you would use a rotary pump for very viscous liquids (over 2500 s.s.u.). Or where poor suction conditions exist. Or when positive displacement is required. Centrifugal pumps would be used for extremely corrosive or abrasive liquids, low viscosity liquids (under 2500 s.s.u.) water, slurries, or petroleum products.

But . . . in many applications combinations of these factors exist. Or the liquid you want to pump is not clearly in either area. Then there are other considerations such as initial cost, operating cost, lubrication value of the liquid, location and even budget limitations.

All of these considerations can put you in the middle—where either a rotary or centrifugal can be used. The best choice can only be made by someone with experience and knowledge of both types.

As one of the few manufacturers of a complete line of both rotary and centrifugal pumps, Worthington can help you select the best, most economical solution to this perennial pump problem. For the name and address of your nearest Worthington representative, consult the yellow pages.

P.S. If you'd like a copy of a 50-page booklet, "Rotary and Centrifugal Pumps: Theory and Design," please write to Worthington Corporation, Section 20-14, Harrison, New Jersey, for bulletin G-2666.

WORTHINGTON

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WANT TO TURN MAINTENANCE DOLLARS INTO PROFIT DOLLARS?

Tom Robertshaw can show you how. Tom's a paint expert—one of a growing force of specialists that constitutes Du Pont's Technical Service Group. His mission: to help you pare down the high cost of maintenance painting. As he sees it:

"Every maintenance dollar you save is a profit dollar. Of course, to insure maximum return on your investment, you've got to begin with quality paint. Too many maintenance men have learned the costly lesson that price-per-gallon as a measure of economy can be mighty misleading. When you specify Du Pont, you're getting the best paint available, backed up by proven performance in the field.

"However, that's only half the story. To bring down the cost of protecting your equipment—and keep it down—the right paint *system* is vitally important. Here's where Du Pont technical competence really pays off. We see to it that the system you employ is specifically suited to your needs. Our recommendations, based on a thorough study of your particular problem, cover everything from surface preparation and paint selection to the most efficient methods of application. We'll show you, too, how to use color effectively to improve plant appearance and promote safety. It adds up to this: lasting protection and longer service life *at lowest cost per square foot per year.*"

There are men like Tom Robertshaw working out of Du Pont district sales offices from coast to coast. Why not let one of them put his training and experience to work for *you?* Call the office nearest you, or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. F-66, Wilmington 98, Delaware.

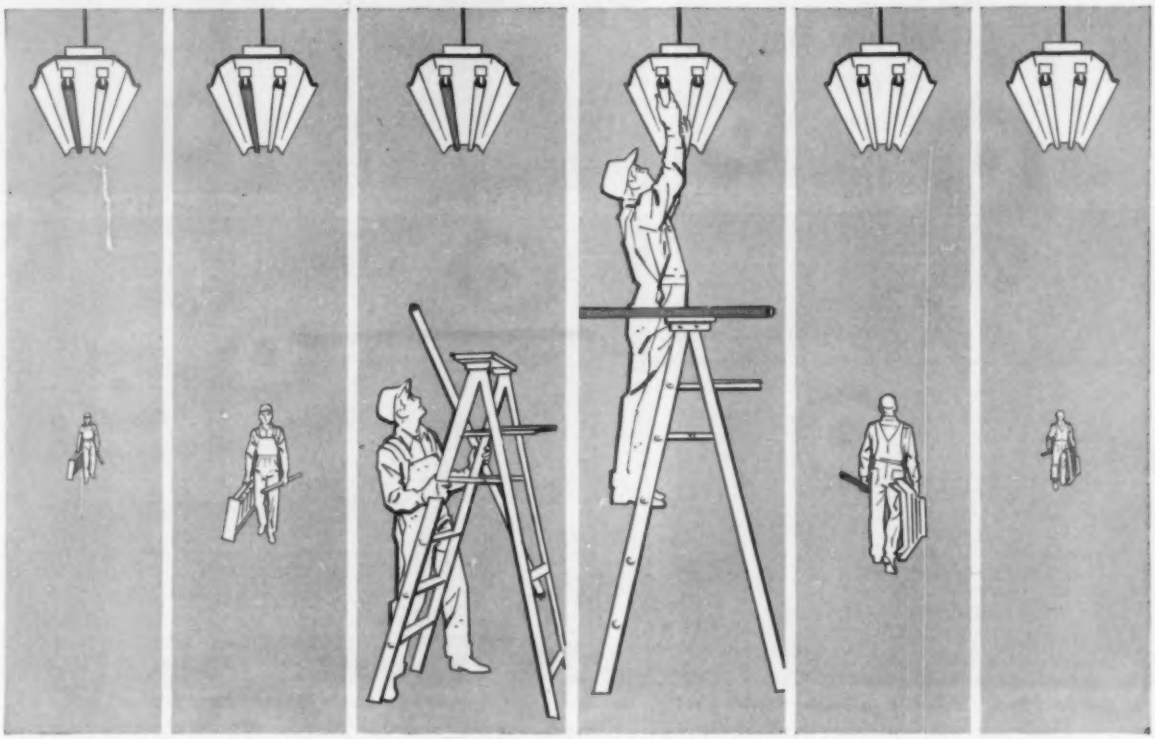
* * *

Thomas J. Robertshaw began his career with Du Pont in 1938. Following wartime Navy service as an Aircraft Finishes Specialist, he returned as Assistant to the Sales Technical Advisor in Philadelphia. In 1952 he was made responsible for Maintenance Sales in New England and upstate New York. Since 1957, he has been Central District Manager, Industrial Maintenance Sales. Among the industries for which he has solved maintenance painting problems: marine, automotive, chemical, steel, petroleum and food.

DU PONT PAINTS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

How long does it take him to replace one lamp?



TWENTY MINUTES! That's the average time it takes to replace one lamp. First the phone call for maintenance, then the requisition, lamp, ladder, hike to the site, lamp replacement, the walk back, disposal of old lamp, put ladder away. And work interruptions among other employees, caused by one-at-a-time lamp replacements are an expensive item not included.

This General Electric Plan can save you 26 hours labor on every 100 lamps you use!

It takes a man about 33 hours to replace 100 lamps if he does it one-at-a-time . . . and less than 7 hours if he does it with this modern General Electric Plan for group relamping. That's a cut-and-dried savings of 26 hours for every 100 lamps you use. Twenty six times the hourly cost of your maintenance man!

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Records prove this simple plan works best with General Electric Lamps. Why? Because they have a more uniform lamp life. They last most customers well over 2 years . . . with fewer early burnouts. What's more, the plan has a built-in reminder that eliminates record-keeping—tells you when it's time to begin another cycle. *Right now* is the best time for you to suggest this money-saving system to *your* company.

Send coupon for full information on General Electric's simplified Group Relamping Plan. It's free, no obligation. When you get it, see for yourself just how much you can save—in good hard cash for your company.

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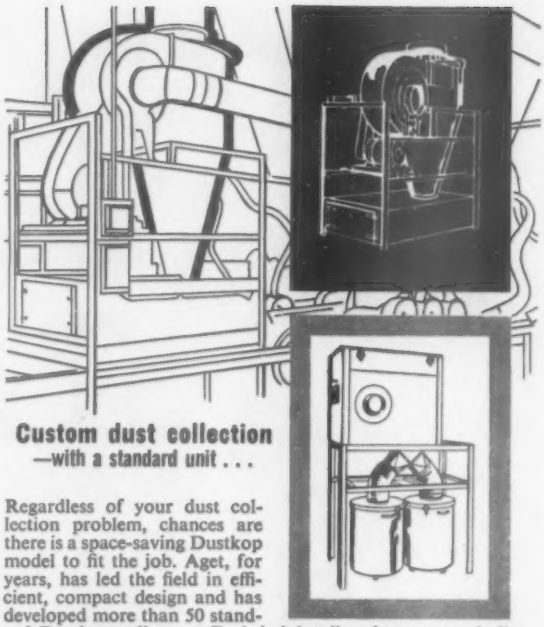

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Regardless of your dust collection problem, chances are there is a space-saving Dustkop model to fit the job. Aget, for years, has led the field in efficient, compact design and has developed more than 50 standard Dustkop collectors. Each is job-tailored to most grinding, buffing or finishing operations—as well as many other types of service. Write for illustrated brochure that helps select your tailored Dustkop unit.

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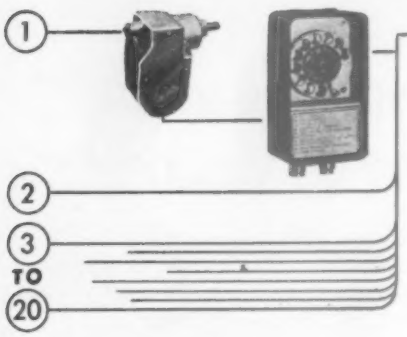
DON'T MAKE A PRODUCTION REPORT Unless it is ACCURATE!



How can you get an accurate report?

USE THE CENTRALOGRAPH!

1. It is synchronized with the plant clock.
2. It is so connected to your machines or points on production lines that its chart (Centralogram) shows EXACTLY . . . . . .
   - a. When production starts
   - b. How long production uninterruptedly continued
   - c. When production stopped
   - d. WHY IT STOPPED
   - e. When it began again
   - f. Total minutes of production per shift
   - g. Total down time per shift
   - h. REASONS FOR DOWN TIME
   - i. Plant efficiency
   - j. What you must do to increase that efficiency

If you're willing to spend up to $6,000 to make sure your plant runs at top efficiency, contact us.

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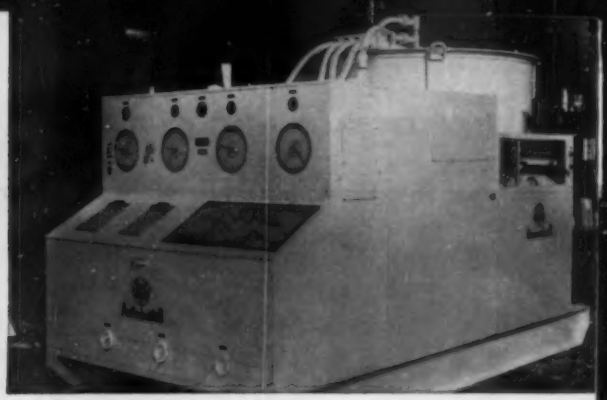

"We've cut handling costs 50% by dealing with U. S. Steel Supply."

says Mr. George W. Smith, Plant Superintendent, Barnard & Leas Manufacturing Company, Inc., Cedar Rapids, Iowa

"We used to order 60% of our materials from the mill, and 40% from a steel service center," says Mr. Smith. "But during the recent steel strike, we looked closely at our inventory situation. After a thorough study, we revised our operation completely. We now order 70% from a steel service center and 30% from the mill.

"We had a scrap problem when we ordered from the mill, because we had to process the materials. The scrap had to be handled and stored until we had enough to market. Today, we order wide flange beams, angles and channels, plate, sheet, and bar size flats and angles direct from U.S. Steel Supply, and they're delivered *pre-cut to the exact shape and size.*

"This saves time and we don't have to invest in expensive machining equipment. And here's another point; the quick, reliable service we get from U.S. Steel Supply has more than once allowed us to accept a rush order for a piece of heavy equipment."

Do you have an inventory, scrap or production problem? Perhaps U.S. Steel Supply's new folder entitled "How to Subtract Hidden Inventory Costs" can help you solve it. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under Steel.

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NEVER OUT OF TOUCH...WITH PAGEMASTER®

Ever feel like a tracer of lost persons—because your key personnel are out of sight and out of reach?

With a Pagemaster® selective wireless paging system by Stromberg-Carlson you never lose contact with them. You can translate this directly into *greater efficiency, reduced downtime.*

You can contact your key men in seconds because Pagemaster paging is instantaneous, positive, completely selective. Each man equipped with a transistorized pocket-size receiver has an exclusive call signal. When he's needed, his receiver alerts *him*—and nobody else—immediately with an audible tone. He simply picks up the nearest telephone and reports.

You may *buy or lease* a Pagemaster system. Start with enough receivers to meet present needs . . . expand later without additional installation costs.

Want to know more? Call, wire or write to Commercial Products Division, 1402-06 North Goodman Street, Rochester 3, New York.

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INSTANTANEOUS, POSITIVE, SELECTIVE PAGING WITH PAGEMASTER ASSURES REACHING KEY PEOPLE WHEREVER THEY ARE IN YOUR PLANT—INDOORS OR OUT.

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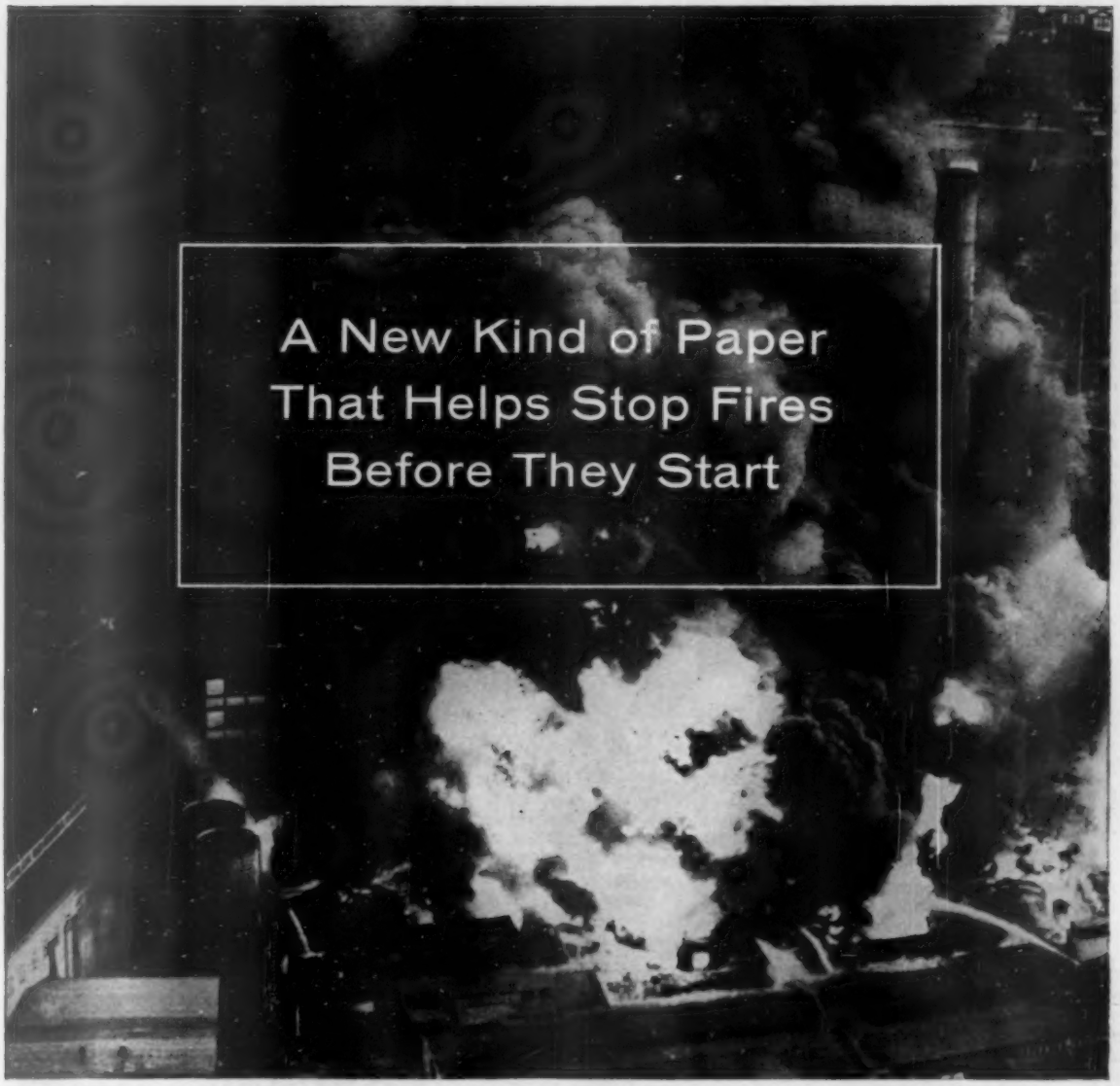

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Pyro-Kure vapor barriers are unique in being *permanently* non-combustible. They have a perm rating of less than 0.1 and are being used as insulation facing, pipe jacketing and duct lining. Leading insulation manufacturers are combining them with their products. Write Dept. AS2 for technical literature and samples on this vapor barrier line.

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Went out of business

(it could happen to you... TODAY!)

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That, of course, means Fairbanks-Morse, pioneers of diesel building in America. No other manufacturer produces so great a variety of diesel engines for *all* services and purposes, from one-cylinder and five hp to 12-cylinders, 4200 hp . . . and *matching* generators, alternators and generator sets.

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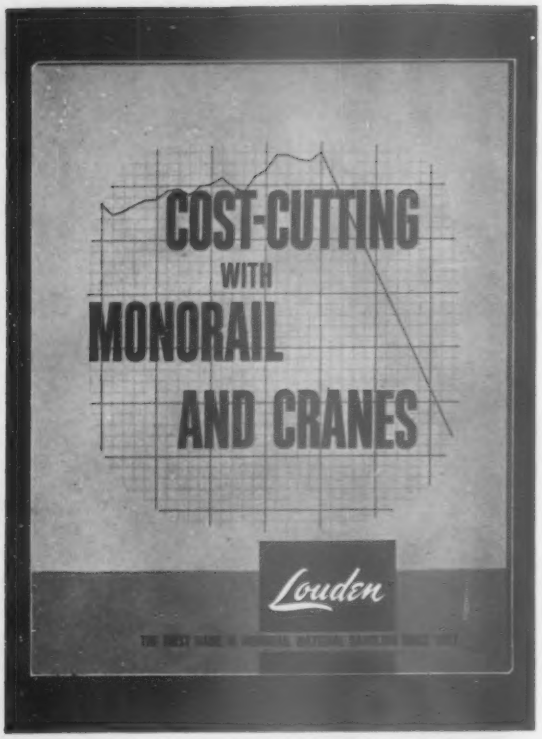

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FACTORY

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EMPLOYMENT • BUSINESS • **OPPORTUNITIES** • EQUIPMENT—USED or RESALE

DISPLAYED RATE

The advertising rate is $27.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

EMPLOYMENT OPPORTUNITIES—$37.40 per inch subject to agency commission.

INFORMATION:

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

An ADVERTISING INCH is measured 7/8 inch vertically on one column, 3 columns—30 inches—to a page.

UNDISPLAYED RATE

(Not available for Equipment Advertising) $2.40 a line. Minimum 3 lines. To figure advance payment count 5 average words as a line. (See ¶ on Box Numbers.)
POSITION WANTED undisplayed rate is one half of above rate, payable in advance.
BOX NUMBERS count one additional line.

Send New ADS or Inquiries to Class. Adv. of Factory, P. O. Box 12, New York 36, N. Y., for July Issue Closing May 18th

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

POSITION WANTED

Chemical Plant Manager, B. Ch.E., age 41, offers broad engineering and business background in chemical industry. At present, works manager of multi-product plant. Desires challenging position with growth probabilities. PW-4491, Factory.

SPECIAL SERVICES

Time Study Boards with transparent watch holders, stop watches. Pedometers. Slide Rules. Forms in stock. Sample Kit Free. Oznam Products Co., 5544 S. Homan Ave., Chicago 29.

"Put Yourself in the Other Fellow's Place"

TO EMPLOYERS

TO EMPLOYEES

Letters, written offering Employment or applying for same are written with the hope of satisfying a current need. An answer, regardless of whether it is favorable or not, is usually expected.

MR. EMPLOYER, won't you remove the mystery about the status of an employee's application by acknowledging all applicants and not just the promising candidates.

MR. EMPLOYEE you, too, can help by acknowledging applications and job offers. This would encourage more companies to answer position wanted ads in this section.

We make this suggestion in a spirit of helpful cooperation between employers and employees.

This section will be the more useful to all as a result of this consideration.

Classified Advertising Division

McGRAW-HILL PUBLISHING CO., INC.
330 West 42nd St., New York 36, N. Y.

PROJECT DEVELOPMENT ENGINEER

With heavy experience in design and evaluation of extrusion and injection molding equipment.

Realize all the advantages that this medium-sized leader in the plastics industry can offer: individual recognition, excellent growth potential, maximal compensation and benefits, and delightful Massachusetts location.

Write Personnel Director

FOSTER GRANT CO., INC.
Leominster, Mass.

FOREIGN EMPLOYMENT
DISTRICT INDUSTRIAL ENGINEER

BS or MS Degree Industrial or Mechanical Engineering with post graduate studies production control, tool design, material handling, industrial psychology, etc. Practical industrial experience required with at least 2 years supervisory capacity in fabricating industry. Experience as machinist or tool maker desirable.

Excellent opportunity large copper company Chile, South America. 2 year contract with transportation both ways and salary while traveling paid by Company. In reply give complete details.

P-3653—FACTORY

Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

CHIEF MANUFACTURING ENGINEER

$12,000 - $14,000

Large agricultural farm tractor manufacturer will groom man for position as chief manufacturing engineer with potential of $18,000 per year. Must have experience and can handle the administrative duties of plant engineering, tool design, pattern design, process and methods determination, time study, and tool room function. No fee. Located in midwest.

MONARCH PERSONNEL
28 E. Jackson Blvd., Chicago 4, Illinois

FOR SALE—3 MONITOR STARTER PANELS
3 phase, 60 cycles, 200 HP
440 Volts
Type 6635 DAA 1
COMFORT SPRING CORP.
Fairmount Ave. and Bethel St.
Baltimore 31, Md.

INDUSTRIAL ENGINEER

The position, Supervisor of Materials and Methods Economics, is now open in the expanding Engineering Department of the Central Research and Engineering Division. A person with a minimum of five years industrial engineering experience is required.

The individual selected for the position will be interested and capable in applying his ability and experience to research-related problems of concern to this division. The desired applicant must be well versed in the following techniques: presumptive cost evaluation of materials and processes; analysis and prediction of future raw material costs, equipment costs and potential market areas and products; general statistical studies.

Staff members are encouraged to promote their professional stature by active participation in their professional society at the local and national level. Research facilities of the Company's new Chicago laboratories are believed second to none, and are located so as to allow staff members to live in some of the finest western and southern suburbs of the city. Salary and other benefits meet the highest industrial standards.

Please write, giving a brief resume of qualifications, to

Laboratory Director
Mechanics and Processing Laboratory
Central Research & Engineering Division
Continental Can Company
7622 South Racine Avenue
Chicago 20, Illinois

NEW... WESTINGHOUSE STATIC SLIPSYN CONTROL

UPS RELIABILITY, VIRTUALLY ELIMINATES MAINTENANCE

STOP PUZZLING over synchronous motor controls ... here's the advanced way to gain top performance. The all-new Westinghouse Static Slipsyn® control pays its own way by chopping motor control maintenance costs, practically eliminating down time and increasing reliability. Check these advantages:

WESTINGHOUSE STATIC SYNCHRONIZING CONTROL has no moving parts. It uses simple, reliable, transistorized networks instead of conventional relays ... no contacts, bearings and springs to corrode, wear and fail. Size and weight are greatly reduced—and Static Slipsyn control is immune to contaminated, dusty surroundings.

WESTINGHOUSE STATIC SYNCHRONIZING CONTROL precisely applies motor field excitation at proper speed and pole position up to and including 99% of synchronous speed. Pull-out protection is positive and adjustable to avoid false tripping.

FOR NEW AND OLD INSTALLATIONS. Your Westinghouse salesman will help you apply the completely packaged Static Slipsyn control to synchronous motor installations now being planned. And he can show you how static synchronizing control units can replace the conventional, mechanical relays in your present control enclosures. Either way, Westinghouse Static Slipsyn control saves big money through reduced maintenance, improved reliability, shorter down times.

Contact your local representative or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-25001

YOU CAN BE SURE...IF IT'S

Westinghouse

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(Classified Advertising)
F. J. Eberle, Business Mgr.

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Veeder-Root Countrol...

Count-Pak — a line of electronic counters for fast, accurate counting of all types and shapes of objects at medium to high speeds.

...practical, low-cost method to cut costs, improve efficiency

There are five important areas in plant operation where Veeder-Root counters can effectively (and inexpensively) help to control costs and allow maximum utilization of inventory and equipment.

- A counting and tallying program keeps constant track of inventory movement, provides regular checks, "signals" danger spots.
- Counting devices provide a continuous record of production, can be located at individual machines and remoted to centralized control points.
- Counters make it easy to compute and pay by piece or other production unit.
- Cost estimate and cost control can be carefully watched with counters. Machine utilization can be increased.
- Predetermining Counters can actually control machine output and processes, prevent overruns or shortages.

Veeder-Root Counters are easy to apply, can count anything that moves. Ask for complete details from your Industrial Distributor, or application assistance is available from a Veeder-Root Counting Engineer. Call or write, today.

Visicounter — a rugged, heavy-duty all-purpose mechanical counter with high figure visibility.

Remote Indication Electro-Magnetic Counters — used to display production information at centralized or remote locations.

Predetermining Counters — provide low-cost, simplified "automation" by precontrolling production runs to exact figure. Will actuate lights, bells, relays, stop motions.

Vary-Tally — low-cost, mechanical tally for more accurate counting of units, parts, inspection results and the like. Single units, strips, tiers, or any combination.

Veeder-Root
HARTFORD 2, CONNECTICUT
"The Name that Counts"
New York • Chicago • Los Angeles • San Francisco
Seattle • St. Louis • Greenville, S. C.
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Offices and Agents in other principal cities

VRD-53

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COMPANY..... June 1960-1

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Catalogs in This Issue

To help you, here is a list of catalogs described in this issue. To obtain, circle key numbers on either postcard.

AUXILIARY
1—Air Compressors
2—Two-Cycle Gas Engine
3—Furnaces
4—Heat-Distribution Equipment
5—Dust Filter
6—Filters
7—Air Conditioners
8—Motors
9—Glass-Bag Filters

MECHANICAL
10—Helicon Gears
11—Clutches
12—Sheaves
13—Ball Bearings
14—Instrument Bearings

ELECTRICAL
15—Transformers
16—Relay Testers
17—Distribution Equipment
18—Commutator Motors
19—Pilot Lights
20—Insulated Cable
21—Transmission Equipment
22—Contactors and Starters
23—Generator Brush
24—Battery Chargers

MATERIAL HANDLING
25—Conveyor Transfers
26—Flexible Container
27—Storage Structures
28—Crawler Crane-Excavator
29—Forklift-Pallet Rack
30—Material-Handling Equipment
31—Fork Trucks
32—Pneumatic Conveyors

MAINTENANCE
33—Gaskets
34—Fire-Retardant Paints
35—Dirt, Dust Control
36—Vacuum Sweeper

PIPES AND VALVES
37—Relief Valves
38—Couplings, Hose Fittings
39—Unions, Valves
40—Three-Way Valve
41—Valves
42—Flexible Air Duct

PRODUCTION
43—Power Saws
44—Milling Machines
45—Miniature Electric Eyes
46—Air Tools
47—Multiform Grinder
48—Thread Rolling Heads
49—Tracer Mills
50—Cutting Tools
51—Socket Screws
52—Gages

INSTRUMENTS AND CONTROLS
53—Lamp Annunciators
54—Magnetic Starters
55—Computer Control
56—Input Regulator
57—Torque Tension Tester
58—Automatic Batching
59—Controlled Evaporation
60—Dosimeters, Survey Meters
61—Indicating Gages
62—Measuring Instruments
63—Clocks, Systems

Quick delivery of the Drive you need!

Typical final assembly of A-S Drives from completed sub-assemblies

When you purchase a Square D A-S Drive, you get a complete "package"—including drive motor, operator's station and all controls. You also get these important advantages:

QUICK DELIVERY • Square D's unique method of stocking sub-assemblies means quicker deliveries of packaged drives to meet your requirements.

EASY INSTALLATION • Maintenance manuals are complete in every detail, including step-by-step installation instructions. Moreover, each **A-S Drive** is completely factory-tested and adjusted when shipped — only a few trimming adjustments are needed to put it in operation.

MINIMUM MAINTENANCE • Industrially rated components are used throughout, and extra-sturdy cabinets give lasting protection. Static elements and encapsulated circuits—which are virtually maintenance-free — are utilized wherever possible.

EXTRA SAFETY • Only push buttons with heavy-duty construction and potentiometers with industrial clearances are used in operator's stations, for maximum personnel safety.

WIDE VARIETY AVAILABLE • There's a Square D "package" for *any* adjustable-speed job. You can choose from electronic, magnetic amplifier or motor-generator types — with ratings from 1/20 to 400 hp — and with accuracies to within fractions of 1%.

FIELD APPLICATION HELP • Square D has wide experience in the design and manufacture of adjustable-speed drives, and field specialists are trained to help you in the selection of the proper drive.

Write FOR BULLETIN • *Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin*

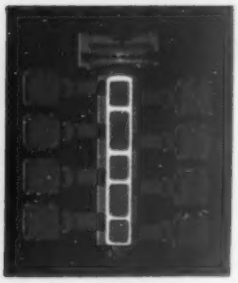
SQUARE D COMPANY

wherever electricity is distributed and controlled

For more facts circle 383 on READER SERVICE CARD

For more facts circle 384 on READER SERVICE CARD →

WILL YOUR NEXT BALANCED OPPOSED COMPRESSOR HAVE ALL OF THESE "HIDDEN VALUES"?



No, it won't! Even if you're astute enough to choose Worthington, you'll get only 23 of the 24 "hidden values" pictured below. (Just to pique your interest one is fictitious. For identification of the phony feature, see page 264.)

Compressors should be evaluated on performance, we think you'll agree. But performance is determined by factors which aren't easily checked against service conditions and data. These are the factors we call "hidden values." It will pay you to evaluate these values the next time you specify a compressor. Worthington Corp., Clinton Street and Roberts Ave., Buffalo 5, N. Y. 36-8

WORTHINGTON

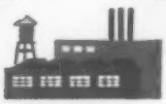
OPTIC COMPARATOR is used to check connecting rod bolt threads for uniform angles, lead and form.

WIRE ALIGNMENT during assembly using electronic equipment minimizes field alignment problems.

FACTORY ASSEMBLY of intercooler and interstage piping reduces installation problems and costs.

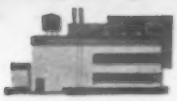
COMPOSITION TEST determines constituents of molten iron in each ladle before any casting is poured.

HONING of connecting rod crankpin and crosshead pin ends results in tighter fits, no loose shells.

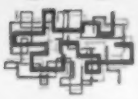


INTEGRATED DIV. includes foundry, manufacturing, sales, service and engineering in one location.

ULTRASONIC TEST— an advanced method of examining certain critical parts for internal quality.



$1,000,000 ADDITION TO LABORATORY assures sound equipment designs based on actual research.



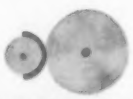
ANALOG/COMPUTER simulates wide range of actual operating conditions for optimum design analysis.

PROFILOMETER inspection of highly finished parts assures easy break-in and long life.

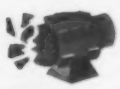
KOLENE PROCESS removes impurities from bearing shell that weaken bond between it and babbitt.

CAST-IN LUBE OIL SYSTEM with internally drilled oil passages eliminates crankcase "plumbing."

MAGNAFLUX AND MAGNAGLO inspections are widely used to expose surface imperfections.

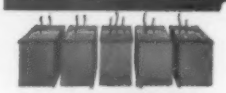


FINISHED GROUND BEARING SHELLS provide positive full-contact backing for long life.

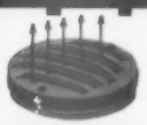


DESTRUCTION TEST of complete compressor cylinders verifies engineers' design calculations.

REMOVABLE DOWEL locks piston rod to crosshead — prevents turning due to loosened crosshead nut.

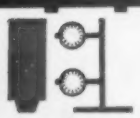


PARCO-LUBRITING of critical wearing surfaces completely eliminates most start-up scuffing problems.



FEATHER VALVE— industry's preferred compressor valve—is efficient, quiet, and low in maintenance.

STEEL TIE BAR, keyed and bolted in place, strengthens frame and maintains the original alignment.



CROSSHEAD SLIPPER ADJUSTMENT within one-thousandth of an inch assures much longer packing life.

THERMODYNAMICS SECTION analyzes each application to size unit and determine its performance.

SALES AND SERVICE INTEGRATION recognizes kinship of one to the other. One man administers both.

ADJUSTABLE ROLLER MAIN BEARINGS feature low friction losses which help to extend compressor life.

AIR CONDITIONED GAUGE ROOM has master gauge blocks constantly used to check instruments.